

Improvement of Fruit Tree Data Inclusion in EURISCO (FRUITTREEDATA)

Period (01/04/2024 – 31/11/2025)

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September 2026

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Activity Report

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INTRODUCTION

Central crop databases (CCDBs) for *Malus*, *Prunus* and *Pyrus* continue (nominally) to exist, although their management has become unsustainable and has stagnated in the case of *Malus* and *Pyrus*. At the time of the most recent Working Group meetings (2010 [*Prunus*] & 2012 [*Malus/Pyrus*]) justification for maintaining the CCDBs was because they were believed to contain accessions that were not listed within EURISCO and had greater potential for the inclusion of characterization and evaluation (C&E) data (and were beginning to include such data) as well as simple sequence repeat (SSR) data and photographs. EURISCO developed the capacity to hold C&E data in 2015 and has invited partners to upload data. This includes developing a system to avoid the requirement for data to come from the National Focal Point. However, as of September 2021 (at the time of developing the proposal) EURISCO presented only 16K C&E datapoints for *Malus* (all from CZE), 2K datapoints for *Pyrus* (again, entirely from CZE) and 13K datapoints for *Prunus* (from CZE and LVA).

From informal discussion, it was clear that a number of Working Group members were aware of germplasm in their respective collections/countries that was not currently listed in EURISCO. In some cases, this represented whole collections missing from the inventory, in other cases collections were only partially listed. In further cases, material was either missing, or over-represented due to a need to adjust accession numbering from the individual tree level to that of the accession.

Through a number of recent European and ECPGR projects, supplemented by national funds, unique genotype codes (MUNQ/PUNQ for *Malus/Pyrus* and more recently CHUNQ for cherry) have been developed in an attempt to help to identify clonal replication* within and between collections. These codes have been applied to a number of accessions that are currently listed in EURISCO (as well as a number that are not). However, such genotype codes were not included in EURISCO and consequently it is not possible to link clonal accessions (which are often held under synonymous cultivar/accession names in different countries). Clonal replication* and synonymy are significant issues in the fruit tree collections.

The aims of the project were therefore:

1. To document an assessment of the remaining value in the *Malus/Pyrus* and *Prunus* CCDBs (with the emphasis on *Prunus* C&E data and novel accessions) with a view that novel available data could be added to EURISCO
2. To identify partner/national holdings that are currently available but missing from EURISCO, and include these in national listings where possible
3. To identify and upload publicly available C&E data for accessions currently listed in EURISCO.
4. To list MUNQ/PUNQ/CHUNQ unique genotype codes for EURISCO material, and identify codes (and potentially associated alleles) that are not currently known to be represented in EURISCO and form a considered position on the potential to include such codes within EURISCO output/search.

The outcomes of the above would, fundamentally, improve the quality of data available through the EURISCO database (ECPGR Objective 2: Phase X). Resolution of gaps in EURISCO accession listings would help to make the database more comprehensive (Objective 2.1) and the inclusion of C&E data would improve the quality of data available (Objective 2.2). Together with a clearer understanding of clonal replication, this would further support the potential development of the AEGIS concept (Objective 1) and contribute to incentivize plant genetic resources for food and agriculture (PGRFA) use (Objective 5).

* Note: the current systems are insufficient to distinguish potentially important clonal mutants but are sufficient to identify the major clonal groupings.

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Activity partners (ECPGR-funded)

Partner ID No.	Name and Surname	Institute	Country
1	Matthew Ordidge	University of Reading	UK
2	Marc Lateur	CRA-W, Gembloux	Belgium
3	Daniela Giovannini & Mauro Bergamaschi	CREA Council for Agricultural Research and Economics, Research Centre for Olive, Fruit and Citrus crops, Forlì	Italy
4	Andrea Patocchi	Agroscope	Switzerland
5	Monika Höfer	Julius Kuhn-Institute, Institute for Breeding Research on Fruit Crops	Germany
6	Zsuzsanna Békefi and Sámuel Szilágyi	National Agricultural Research and Innovation Centre, Fruitresearch Institute	Hungary
7	Willem van Dooijeweert	Centre for Genetic Resources the Netherlands (CGN) Wageningen University & Research	The Netherlands
8	Stein Harald Hjeltnes	Njoes Fruit and Berry Centre	Norway
9	Boris Krska and Jiri Sedlak	Research and Breeding Institute of Pomology Holovousy Ltd.	Czech Republic
10	Helene Muranty and Caroline Denance	INRAE - IRHS	France
11	Frida Çarka	Institute of Plant Genetic Resources (Gene Bank of Albania) Agricultural University of Tirana	Albania
12	Marine Delmas	Unité Expérimentale Arboricole, INRAE	France
13	Gunars Lacis	Institute of Horticulture	Latvia
14	Tuuli Haikonen	Natural Resources Institute (Luke)	Finland
15	Gregor Osterc	University of Ljubljana	Slovenia
16	Hedi Kaldmäe	Estonian University of Life Sciences	Estonia

Self-funded partners

Partner No.	Name and Surname	Institute	Country
1	Stephan Weise	IPK Gatersleben (EURISCO)	Germany
2	Anne-Françoise Adam-Blondon	INRAE-URGI	France
3	Christina Kägi	Federal Dept of Economic Affairs	Switzerland

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Roles

All partners agreed to make an assessment of both accessions and C&E data that were in the public domain but missing from EURISCO and to prepare C&E data for upload where possible. In addition, partners 1, 2, 3, 5 and 12 agreed to carry out assessments of the CCDBs and partners 1 and 10 agreed to carry out assessments of CHUNQ and MUNQ/PUNQ codes, respectively. Partner 9 agreed to share experience of C&E data upload and partner 1 agreed to act as the Project Coordinator.

METHODS / APPROACH

Assessment of the Central Crop Databases (CCDBs)

Assessments of the CCDBs were carried out by members of the subgroup with partner 12 as the lead for the *Prunus* database.

Initially, all data were extracted from the European *Prunus* Database (EPDB) to allow a structural comparison and assessment of data content. Data were also extracted from EURISCO in order to attempt a direct comparison. An initial finding was that many institute codes were missing for EPDB data providers. Institute codes were either assigned based on comparison to EURISCO or based on further research where possible.

Assessment of the accessions missing from EURISCO and publicly available C&E data

Since the situation with regards to EURISCO submissions was specific to each country, partners were charged with each making their own assessments. However, communication was maintained via e-mail and three formal online meetings were held where the majority of partners were able to attend (minutes are available on the ECPGR website). The aim of these meetings was to update on progress, to share experiences and to gather and address any queries that the members had (e.g. on data curation for EURISCO upload). During the first meeting, EURISCO Coordinator Stephan Weise gave a presentation on the C&E data requirements and processes for EURISCO. Further queries from later meetings were passed to EURISCO for advice.

Consequently, each partner made an individual assessment of the data that were available for both accessions and C&E assessments within their country or institution. These were prepared for upload to EURISCO via the respective National Focal Points. A template, including all of the 'traits' detailed within the ECPGR prioritized descriptor documents (for apple, pear, cherry and plum) was circulated to partners to aid with preparing data for upload.

Assessment of the CHUNQ/MUNQ/PUNQ data

Assessments of the CHUNQ/MUNQ/PUNQ data were carried out by members of the subgroup.

CHUNQ

In order to assess how many Cherry UNiQue genotype (CHUNQ) codes were expected to be represented within EURISCO, a complete listing of accessions of *Prunus avium*, *Prunus cerasus*, *Prunus avium* x *cerasus* and *Prunus gondouinii* was first extracted from EURISCO (data extract: 15/09/2025).

Of the EU.Cherry and *Prunus* Alignment partners, the largest numbers of listings in EURISCO were held by Switzerland (2,347 accessions), Germany (1,288 accessions), Romania (891 accessions), Italy (877 accessions), Czech Republic (484 accessions), UK (363 accessions), Austria (330 accessions) and

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Belgium (304 accessions). Smaller listings were also held by Latvia (81 accessions), Greece (69 accessions), Estonia (66 accessions) and Bosnia & Herzegovina (20 accessions).

Since the EU.Cherry project had used a project-specific set of accession codes, it was not always possible to identify the specific accession within the EURISCO passport data. For the countries with larger numbers of entries, it was assumed that all of the accessions submitted to either EU.Cherry or Prunus Alignment were included within the national EURISCO submission (in the latter case because SSR fingerprint data were available, indicating that accessions were being actively curated). For countries with smaller listings, accessions were checked against passport data where possible.

Where CHUNQ codes were only found to be represented by countries without listings in EURISCO, a search for potential matches by accession name was carried out.

MUNQ/PUNQ

The local accession numbers supplied alongside SSR data to INRAE did not always align directly with ACCENUMB in EURISCO. In order to assess how many *Malus* and *Pyrus* UNiQue codes (MUNQ/PUNQ) were expected to be represented in EURISCO, partners were initially contacted and asked to confirm the EURISCO accession numbers for lists of MUNQ/PUNQ allocated entries from each of their institutions and to advise on whether the same might be done for other institutes in their country that had submitted either data or samples for MUNQ/PUNQ allocation.

Following this initial approach, a summary of MUNQ/PUNQ allocated accessions deemed most likely to be within EURISCO was created. Where partners were either unable to fully clarify, or contact was not made, assumptions were made around EURISCO inclusion based on the number of EURISCO entries for each partner country (for example, it was assumed [as above for cherry] that all accessions from the Czech Republic, Germany and Switzerland were listed in EURISCO). This list was then compared to the most recent MUNQ and PUNQ tables, as circulated in June 2026. It was decided to only consider the 'major' MUNQ/PUNQ groupings and subcodes (used in the system to record potentially unresolved variability within clonal lines) were not included in the assessment.

Allelic representation was subsequently assessed following a calculation of allele frequency and a classification of 'rare' (frequency < 5%), 'very rare' (frequency < 1%) and unique alleles within the MUNQ/PUNQ dataset. A comparison was made against the allele representation in the estimated list of EURISCO accessions in order to identify the number (and type) of alleles that were not currently known to be represented within EURISCO accessions.

Additional online subgroup meetings were held with regards to the CHUNQ/MUNQ/PUNQ assessments and the assessment of the CCDBs (with main focus on the *Prunus* CCDB). Updates from these meetings were reported to partners during the main project meetings where possible.

RESULTS

Assessment of the CCDBs

Assessment of the *Malus* and *Pyrus* CCDBs quickly confirmed that they had become redundant. The data were no longer actively updated and were largely limited to accession listings only. The *Pyrus* database had developed a list of synonymies, and this could potentially be used for alternative systems in the future. Otherwise, nothing would be lost when the databases are officially closed.

The *Prunus* database had been used as the exemplar amongst the fruit crops and significantly more work had been carried out to update and include data beyond the accession listings. Nonetheless,

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support had been lacking for a number of years and the data were largely out of date. A detailed assessment of the contents (see Annex 1) revealed that:

- 97,663 datapoints (relating to 6,999 accessions) from EPDB were from countries participating in this project
- 47,307 datapoints (relating to 2,809 accessions) from EPDB are from ECPGR member countries who are not involved in this project
- 50,311 datapoints (relating to 3,763 accessions) from EPDB are from countries that are not currently members of ECPGR. We would deem these to be 'out of scope' for EURISCO and the current Working Group.

Of the data submitted from countries participating in the project, the majority of Institute Codes indicated that institutes were currently submitting (at least passport) data to EURISCO. Institute codes with no current EURISCO submissions, or Institutes with no available WIEWS code were identified in GBR, HUN, ITA, LVA and NOR and partners were asked to each consider and advise on the situation in their country.

In each of the above, the majority of datapoints relate to passport data (84–85% for current ECPGR member countries and 97% for countries not currently within ECPGR).

Direct comparison to EURISCO was complicated by the observation of syntax differences in accession numbers, missing accession numbers in EPDB entries and inconsistent formatting between databases. Of 6,403 EPDB accessions from 23 institutes present in EURISCO, only 1,819 (28%) were able to be found in EURISCO. This highlights the need for partner countries to individually assess whether the C&E data submitted to EPDB are already backed up in EURISCO or are likely to be uploaded in the future. However, it would be reasonable to assume that passport data from institutes with current EURISCO submissions should already be replicated and/or updated within EURISCO through updated National Inventories since the development of EPDB.

Only a small number of data entries (110 images of cherry from FRA and 10 images of cherry from CZE) that are not currently compatible with EURISCO were identified, and it is assumed that these can and will be managed locally by partner countries. No SSR data had been incorporated into EPDB.

Through contact with ECPGR members in countries that were not participating in the project, it was established that:

- Data submitted to EPDB from PRT is superseded by a current national system that works through GRIN-Global and will therefore be fully EURISCO compliant in the future.
- Data within the EPDB from GRC are largely also held by the current institutes. The availability of data in EURISCO may be subject to the completion of the ECPGR data sharing agreement.
- Of the institutes submitting data to EPDB from ROU, the three most currently relevant are all now submitting data to EURISCO. It was also established that all of the data in EPDB from ROU were passport data. The remaining institutes appear to maintain germplasm only in support of local breeding programmes.

It was either not possible to fully clarify, or no response was received, from other countries.

Project partners were able to offer further advice on institutes where data had been submitted to EPDB but (by Institute Code) no data were present in EURISCO:

- Such data from GBR related to genebanks at East Malling Research and were submitted at a time when a publicly funded *Prunus* breeding programme was still in operation. Changes in funding and at the institute level mean that material in the EMR genebanks is no longer considered public domain and so not reported to EURISCO. However, some material has been transferred to GBR030 and will remain available in the future.

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- Data submitted from HUN021 are currently held by HUN040 following a merger of institutions.
- There were 14 institutes (by Institute Code) from ITA listed in EPDB that are currently not found in EURISCO. Following a detailed analysis by the relevant partner, it can be confirmed that three of these institutes fall under CREA and (apart from one [ITA210] which has closed) both submit data to EURISCO under a new Institute Code. They are also joined by a fourth CREA institute in EURISCO that was not listed in EPDB (ITA 380). Five of the institutes were either without Institute Code in EPDB or Institute Codes appear no longer valid. Six institutes still maintain the code used in EPDB but holdings (if still extant) are missing from EURISCO.

This analysis highlights that there remain institutes (ITA027, ITA052, ITA061, ITA223, ITA332 and ITA352) who previously engaged with the EPDB, but who are not currently engaged with EURISCO, and this matter could be considered further in the future. However, it is worth noting that substantially more accessions are currently listed from CREA in EURISCO than were included in EPDB.

Identification of accessions missing from EURISCO

As expected, the results of this assessment varied in scale between partners.

On a local scale, a number of additional accessions were identified, and these were added to either EURISCO or national listings (which will in turn update EURISCO). A national holding of 35 pear accessions was identified in FIN; 38 additional apple and pear accessions were identified in ITA (for the partner collection at ITA380 specifically); several additional pear accessions were included in 2023 and further apple and pear accessions were prepared for submission in 2025 from CZE; an import error was identified in the EURISCO data from CHE and updated data both corrected this and included C&E data (see below); a substantial number of additional accessions (included in the National List but not EURISCO) were identified in LVA and these are expected to be addressed through the ongoing transfer of data to the GenBIS system (that will, in turn feed into EURISCO).

On a national scale, and within the timeframe of the project, the holdings in NLD were re-organized as a Dutch Heritage collection and this necessitated an update of all passport data. Policy on EURISCO submission was changed in EST (who formerly only listed material of Estonian origin) and the EST submission was expanded to include all genebank holdings (an additional 178 *Malus* and 36 *Prunus* accessions from 20 and 11 countries, respectively, after checking viability in the field collection). Within GBR, discussions had already begun, and an additional set of 461 accessions (315 *Malus* and 146 *Pyrus*) were submitted to EURISCO by Plant Heritage (GBR252) as an umbrella organization of UK public and private collections. Discussions have begun with the Royal Botanic Gardens (Edinburgh and Kew) and the Welsh Botanic Garden in the UK around whether their holdings of fruit trees could be included in National Lists and, in turn, EURISCO. Approximately 100 apple accessions were prepared for upload from SVN and an additional set of pears is expected to be added in the coming year (neither apple or pear were previously included in the SVN submissions).

The partner from BEL used the project to reorganize, add and update data that were formerly submitted to EURISCO. Overall, passport data for 2,569 accessions (1,210 apple, 932 pear, 212 cherry, 183 plum, 29 peach and 3 *Prunus* sp.) representing almost 28,000 passport datapoints from BEL was either added or updated in National Listings and this will be uploaded to EURISCO. This was achieved through a combination of adding to the collection and improving the local database, which allowed an additional 1,505 accessions to be newly listed (539 apple, 690 pear, 158 cherry, 84 plum, 22 peach). In addition, the BEL019 genebank is in the process of taking on the former collection from BEL020 (whose activities in this area came to an end around six years ago).

The remaining partners reported no accessions missing from their EURISCO submissions.

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Identification and upload of publicly available C&E data

A number of partners were able to curate existing data that were deemed to be publicly available, and these were either uploaded into EURISCO or passed to National Focal Points in order to be uploaded in line with national schedules. A summary of the major additions by crop type is included below:

Crop	Country	Accessions	Descriptors	Datapoints (approximated due to missing data)
Almond	ITA	8	13	104
Apple	HUN	27	5	135
	ALB	11	47	517
	ITA	76	8	608
	DEU	579	3	1,737
	NLD	102	23	2,000
	LVA	144	33	4,752
	GBR	2,002	25	31,550
	CHE	~5,600	60*	220,000
			Total	261,299
Cherry	ALB	13	22	286
	DEU	12	25	300
	LVA	15	33	495
	ITA	77	8	616
	HUN	412	5	2,060
	GBR	349	14	4,365
	CHE	~970	56*	33,000
			Total	41,122
Peach	HUN	150	5	750
	ITA	66	24	1,418
			Total	2,168
Pear	DEU	11	16	176
	ALB	14	43	602
	HUN	153	5	765
	GBR	522	25	8,778
	CHE	~2,800	59*	130,000
			Total	140,321
Plum	DEU	7	18	126
	ITA	33	9	297
	ALB	25	23	570
	HUN	310	6	1,860
	GBR	326	15	4,746
	CHE	~840	56*	37,000
			Total	44,599
<i>Prunus</i> spp.	ITA	31	6	186

Table 1. Summary of additional C&E data prepared for EURISCO during the course of the project

*Note: the data from CHE also includes a smaller number of subdescriptors (included in the total datapoints)

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A huge amount of data was prepared for upload by the partner in CHE. These data come from the integrated national network and represent the holdings of multiple collections (23 apple, 16 pear, 14 cherry and 8 plum).

At the time of writing, EURISCO currently contains C&E data from ALB, BEL, CZE, DEU, GBR, ITA, LVA and NLD (51,850 datapoints for *Malus* [previously 16K datapoints all from CZE], 11,453 datapoints for *Pyrus* [previously 1,926 entirely from CZE] and 25,250 datapoints for *Prunus* [previously around 12,500 from CZE and LVA only]).

Further data are expected to be included during 2026 from NOR and BEL, and additional datasets have been identified by partners that will be available once they are considered in the public domain (see below). The remaining data detailed above will be subject to upload and/or sign-off by the National Focal Points.

Assessment of CHUNQ and MUNQ/PUNQ codes in relation to EURISCO

CHUNQ

The available CHUNQ codes are based on the publications (Barreneche et al., 2021 <https://doi.org/10.3390/plants10101983> and Ordidge et al., 2021 <https://doi.org/10.3390/plants10061243>) that arose from the ECPGR EU.Cherry and Prunus Alignment projects, respectively. Altogether, 289 unique codes had been allocated, including both codes published by Barreneche et al. (2021) and a combination of 'matching group' codes (Ordidge et al., 2021) and further unpublished codes based on the UK collection and associated data alignment.

Of the 289 CHUNQ codes that have so far been allocated, 226 appear to be represented within current EURISCO listings. It is possible that another 19 are listed but these can only be identified through extension by name (i.e. without any current genetic data). Of the 44 CHUNQ codes not represented, the majority arose from accessions in France (16), Norway and Sweden (14). Many of these have the potential to be included within EURISCO.

The EU.Cherry project aimed to include material from a wider geographic range but, with the exception of five accessions from Morocco, all of the remaining allocated CHUNQ codes were represented by accessions from countries that either have been, or currently are members of ECPGR.

From an initial survey of duplication, it can be noted that accessions representing 48 CHUNQ codes are at least demonstrated to be duplicated within EURISCO. Of these, 28 are present at least twice, 12 are present at least three times, 6 are present at least four times and 2 are present in at least six countries.

MUNQ/PUNQ

The overall MUNQ/PUNQ dataset is still awaiting publication and remains available to contributing partners only (although subsets of data have been published by partners and a manuscript relating to the MUNQ dataset is in progress). In total, there are currently 10,049 MUNQ codes and 3,848 PUNQ codes that have been allocated (as above, not counting subcodes that generally indicate either variability in scoring or potential variability within clonal lines).

Within the group of accessions that are held by project partners and were also deemed to be listed in EURISCO, we identified 3,880 MUNQ codes and 885 PUNQ codes. This would suggest that approximately 6,169 MUNQ codes have been allocated to genotypes that are yet to be included (or identified) in EURISCO; similarly, 2,963 PUNQ codes are not yet confirmed to be represented in EURISCO.

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Considering allelic representation, 573 alleles were identified within the MUNQ dataset, with 302 being classified as 'very rare' (frequency < 1%), 73 being 'rare' (frequency < 5%) and 101 being unique. Eight hundred and thirty-six (836) alleles were identified within the PUNQ dataset, with 458 being classified as 'very rare' (frequency < 1%), 149 being 'rare' (frequency < 5%) and 113 being unique. From the above analysis, we determined that 153 of the alleles in the MUNQ database were not confirmed to be represented within EURISCO (of these, 69 were unique and 84 were 'very rare'); 307 of the alleles in the PUNQ database were not confirmed to be represented within EURISCO (of these, 103 were unique, 203 were 'very rare' and one was 'rare'). All the common alleles in the MUNQ and PUNQ systems were therefore shown to be represented within EURISCO.

Further results and outcomes

In addition to the above, a poster concerning the project was presented (by the partner from NOR) at the ISHS Apricot Plum Symposium, 22–26 April 2024, in Avignon. The title of the poster was: "Improvement of fruit tree data inclusion in EURISCO" (see Annex 1). The project was also advertised by partners at the Rosaceous Genomics Conference in Spain, May 2025.

The partner in ITA also requested DOI codes for their accessions in line with the curation of data. These were issued for 6,081 accessions, and further codes are awaited for 357 accessions.

C&E datasets were deposited by the partner in GBR within the University of Reading data archive. These are cited in the EURISCO submissions and include some additional data for accessions that are no longer extant (and therefore no longer listed in EURISCO).

A major, overarching result of the project is that representatives from multiple countries have now gained direct experience of curating C&E data for upload to EURISCO and that this has been achieved through a collaborative effort. We would expect project partners to be able to advise further on uploading such data to other genebanks within their country and within the ECPGR community more widely.

Constraints encountered

Assessment of the CCDBs

It was our initial intention that any remaining data within the EPDB would be submitted directly to EURISCO (under the system whereby we understood that, with permission, non-National Focal Points were able to upload data). However, having clarified the situation, it is now clear that any delegated upload process still requires sign-off by the National Focal Point of each country. We expect that it will remain necessary for partners in each country to individually manage these data through that route. Data will be made available from the EPDB if it is not already accessible within the partner country.

Identification of accessions missing from EURISCO

The project coincided with a plan to transfer data from LVA into the GeNBIS system. This will act to align data automatically with EURISCO but the transfer is governed by a different timescale. Accordingly, some of the data will only be updated in line with this local development.

Identification and upload of publicly available C&E data

During the course of the project, the organizational structure relating to fruit genetic resources in NOR was under development. The work of the partner focused on establishment of the process and data available, and it is expected that a substantial export of data to EURISCO will be carried out in 2026.

A number of partners reported that, whilst they did have access to further C&E data, they were either not considered to meet the 'EURISCO standards' or they were not considered to be in the public domain

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due to an intention to use the data in scientific publication (the latter would be made available after publication). Examples of this would include up to 588 datapoints on sour cherry in FIN and approximately 4,700 datapoints for *Malus* in LVA.

Furthermore, some partners still have either queries or challenges with preparing C&E data in an acceptable format for EURISCO. These issues generally relate to the need to create single representative values from what are often complex 'experimental' observations that have occurred either over many years or multiple sites, and where data have been recorded at the tree level rather than the accession level.

Assessment of the CHUNQ and MUNQ/PUNQ codes in relation to EURISCO

The initial assessment of MUNQ/PUNQ datasets identified that Accession Numbers and/or codes that had been submitted to INRAE alongside SSR data were often not directly linked to the ACCENUMB entry for the accession in EURISCO. This required a round of confirmation whereby partners were required to confirm which entries in the MUNQ/PUNQ set were included in EURISCO. Consequently, the comparison to EURISCO holdings was limited to partner institutes/countries.

A similar situation was apparent for the CHUNQ data. However, given the less comprehensive dataset, a more simplistic approach was taken in the analysis of the CHUNQ data (see above).

RECOMMENDATIONS

We would recommend that the CCDBs be recognized as formally decommissioned from this point onwards (unless any partners require data from EPDB to be resupplied for them to upload into EURISCO directly). The objective of the CCDBs in housing passport and C&E data has been fully replicated by EURISCO. The CCDBs did aspire to also offer a place for image and genetic (SSR) data and, whilst neither is addressed by EURISCO, it would be worth considering options for these data types in the future. Some partners are able to make such data available through national databases, but others are currently not.

Partners should each investigate whether C&E data from the EPDB from other institutes in their countries are currently being uploaded in parallel to EURISCO and/or are at least still available in their country of origin. National Working Group members from non-project partner ECPGR countries that are not reported on above (i.e. ESP, POL, SVK, TUR) should consider, and if possible report, whether data from EPDB are currently being uploaded in parallel to EURISCO and/or are at least still available in their country of origin. Since the remaining data in EPDB from non-ECPGR member countries (ISR and UKR) was 97% passport data, we would recommend that this is accepted to be out of date and therefore effectively already currently lost to ECPGR; no contact points for either country remain listed in the Working Groups.

It should be noted that the CHUNQ analysis was limited by the number of accessions that were either analyzed during EU.Cherry or for which data were made available for Prunus Alignment. Further comparisons by name would require confirmation by genetic analysis to confirm further representation. It is also important to note that the allocation of CHUNQ codes has only been made to a subset of accessions within the aligned datasets. A more comprehensive analysis in the future would be worthwhile.

Due to the need for additional consideration of the listings, the MUNQ/PUNQ assessments were limited to project partner countries. A more comprehensive assessment including all EURISCO entries would be worthwhile. As part of this, it would be necessary to further clarify the linkage between the genetic data submitted for MUNQ/PUNQ allocation and the passport data for the same accessions in EURISCO (and potentially other databases, noting that the MUNQ/PUNQ initiative has expanded beyond Europe).

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Allelic representation was used as a proxy, to further assess the range of MUNQ and PUNQ codes that remained outside of the EURISCO system. As above, it should be noted that the MUNQ and PUNQ initiatives have expanded beyond the remit of ECPGR and so it might be expected that some accessions (and diversity) will remain missing from EURISCO. However, a more detailed analysis of the diversity represented by these missing accessions and/or alleles would be worthwhile. For example, we are aware that the MUNQ and PUNQ systems (as a method to simply differentiate clonal lineages) have included numerous known and presumed seedling trees. It would not be advisable for genebanks to attempt to collect and conserve every unique genotype, but it is evident that there remains a substantial body of material that cannot currently be identified within EURISCO. ECPGR members should consider this when developing future accession policies.

Members remain of the view that a clonal identifier on the lines of the MUNQ/PUNQ/CHUNQ coding would be a useful character to include within EURISCO. However, the method for including this remains unclear. Some members have included it as OTHERNUMB, others have considered including as a 'trait'. It would be useful to clarify the best way to include such a qualification and we would expect that an equivalent might also be useful for the other crops.

We would also suggest that ECPGR/EURISCO continues to consider the most appropriate ways to handle data from multi-year experiments. These are potentially of more relevance to the vegetatively propagated and/or perennial crops where measurement of characters over multiple seasons as part of a single 'experiment' is often standard.

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ANNEX 1

Summary tables of data assessment from EPDB

Table 1. Number of passport datapoints by country and EPDB sub-database

Database	BEL	CHE	CZE	DEU	ESP	FRA	GBR	GRC	HUN	ISR	ITA	LVA	NOR	POL	PRT	ROU	SVK	SVN	TUR	UKR	ALL
almonddb	0	0	0	0	2328	292	6	321	635	318	662	0	0	0	0	469	139	321	2783	1219	9493
apricotdb	28	0	1322	0	0	1638	0	35	4240	2436	1887	534	52	0	0	1017	255	0	2612	9077	25133
cherrydb	6073	0	5309	4611	1586	3087	6609	182	2064	626	15671	1083	0	2044	361	1712	761	0	2373	16201	70353
peachdb	0	0	0	0	4096	3062	207	231	1949	3811	3785	26	0	0	0	632	144	0	853	1448	20244
plumdb	2445	2778	1181	0	1208	1486	3271	0	3412	1443	2740	453	141	2176	0	5368	856	0	4993	12285	46236
Total																					171459

Table 2. Number of C&E datapoints by country and EPDB sub-database

Database	BEL	CHE	CZE	DEU	ESP	FRA	GBR	GRC	HUN	ISR	ITA	LVA	NOR	POL	PRT	ROU	SVK	SVN	TUR	UKR	ALL
almonddb	0	0	0	0	1559	289	0	292	519	98	422	0	0	0	0	0	67	213	1692	0	5151
apricotdb	0	0	80	0	0	0	0	75	1699	551	1539	0	0	0	0	0	210	0	1070	0	5224
cherrydb	0	0	1249	1136	224	401	0	77	217	74	3685	99	0	342	24	0	113	0	203	0	7844
peachdb	0	0	0	0	1120	2587	0	338	468	724	0	0	0	0	0	0	32	0	334	0	5603
plumdb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total																					23822

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ANNEX 2

Poster as presented at ISHS Apricot Plum Symposium, 22–26 April 2024



Improvement of fruit tree data inclusion in EURISCO - FRUITTREEDATA

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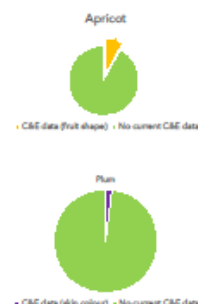
Introduction to the project

The FRUITTREEDATA project includes 19 partners from 15 countries and is funded under the European Cooperative Program for plant Genetic Resources (ECPGR) Activity Grant Scheme. The main activities in the project will be carried out in 2024 and 2025. The objective of the project is to support the inclusion of Characterization & Evaluation (C&E) data for *Prunus* (and *Malus/Pyrus*) in the EURISCO information system.



Very few C&E data for the fruit tree crops exist in EURISCO, as illustrated in the pie-charts at right. The FRUITTREEDATA project aims to improve this picture. EURISCO currently lists 5,728 accessions of *Prunus domestica* from genebanks across 25 countries whilst C&E data are available for only 110 of these accessions (all of these are in Czechia); 2,623 *Prunus armeniaca* accessions are listed from genebanks across 15 countries whilst C&E data are available for only 210 of these accessions (and again, all of these are in Czechia).

More C&E data is present in the CCDBs, however these databases will be terminated and all future development will be in EURISCO



Recent efforts within ECPGR have updated the standardized C&E descriptor documents for fruit trees. Updated documents have been published for cherry, apple and pear and a document for plum was recently uploaded at ECPGR homepage. ECPGR members have been collecting C&E data on their accessions for a number of years.



We are also aware of gaps between the listings of accessions in EURISCO and the material that is known to the curators of the field genebanks. The project aims to fill this gap by identifying accessions for potential inclusion in National Listings. Additionally, for *Malus*, *Pyrus* and *Prunus* (cherry) the recently developed system of MUNO/PUNO/CHUNO^{1,2} genotype coding will be used to help identify clonal duplicates within EURISCO. No such system is available yet for plums.



Data from the CCDBs in *Prunus*, *Malus* and *Pyrus* need to be exported to EURISCO. Now data from the collections will be uploaded directly to EURISCO

EURISCO
<https://eurisco.ipk-gatersleben.de>



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¹Denancé, T., Cárdenas de la Concepción, M., Bloch-Delmas, M., Ordridge, M., Nyholm, H., Laci, G., Feldmann, D., Sedlak, J., Meland, M., Kaldmäe, H., et al. (2021) SSR-Based Analysis of Genetic Diversity and Structure of Sweet Cherry (*Prunus avium* L.) from 19 Countries in Europe. *Plants* 10, 1993. <https://doi.org/10.3390/plants10111993>

²Denancé, T., Muranty, H., Lateur, M. and Ordridge, M. (2023) MUNO and PUNO - a European and international apple and pear genepool coding system. *Acta Hort.* 1394, 471-476. DOI: 10.17660/ActaHort.2023.1394.59