

# PRUNUS WG REPORT FOR PHASE X (2019-2023)

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## 1. CONTRIBUTION TO ECPGR OBJECTIVES

### 1.1. Achievements and success stories

- To efficiently conserve and provide access to unique germplasm in Europe through AEGIS and the European Collection  
Synonymies, homonymies and redundancies are very common in clonally propagated PGRs, e.g. fruit trees, creating significant issues in EU collections. Under the ECPGR EU.Cherry project, a very effective set of 14 SSR markers was selected for cherry (Barreneche et al., 2021), with an improved discriminative capacity as compared to the one developed in 2009 in ECPGR (Clarke and Tobutt, 2009), and used to assess the genetic diversity of 314 accessions from 19 countries, and identify 220 SSR unique genotypes. Later, under the Activity *Prunus* Alignment, the said selected SSR set plus a combination of standard reference genotypes and ad-hoc EU cherry variety selections was used to align 2,241 SSR profiles of cherry germplasm accessions belonging to France, Germany, Italy, Sweden, Switzerland and UK national collections; this aligned SSR dataset allowed us to identify groups of previously unknown matching accessions and to identify and resolve a number of errors in prior datasets. The combined and aligned dataset represents a significant step forward in the coordinated management of field collections of cherry in Europe. The AEGIS (A European Genebank Integrated System) initiative to develop a better coordinated European collection within ECPGR will benefit from the ability to align and compare DNA marker data produced in different countries.  
Unique genotype codes CHUNQ for cherry were also developed in an attempt to help to identify clonal replication within and between collections. CHUNQ codes have been applied to the accessions characterized by indistinguishable genetic profiles and this code could also be included in EURISCO, though such codes are not currently foreseen in EURISCO and consequently it is not possible to link clonal accessions (which are often held under synonymous cultivar/accession names in different countries).
- To provide passport and phenotypic information of actively conserved European PGRFA diversity *ex situ* and *in situ* through the EURISCO catalogue  
Previous ECPGR Projects, such as PRUNDOC and EU.CHERRY, allowed the WG to develop specific Passport and priority descriptors guidelines for plum and cherry, that the WG agreed to use when phenotyping their collections. Several cherry and plum accessions were then described by using the common descriptors selected, and the completed and corrected dataset is compatible with EURISCO.  
The project FRUITTREEDATA, approved for funding during the 5th Call for Proposals of the ECPGR Grant Scheme, will increase and update the listing of available material within EURISCO and/or establish the reasons for the lack of inclusion of known material in National Lists.
- To improve *in situ* conservation and use of crop wild relatives  
The WG did not conduct specific and coordinated activities in this area

- To promote on-farm conservation and management of European PGRFA diversity  
The WG did not conduct specific and coordinated activities in this area
- To promote use of PGRFA  
The characterization and evaluation of *Prunus* accessions with standardized tools, such as the descriptors guidelines developed in the last years by the WG, is a prerequisite and indispensable condition for facilitating access and promoting the use of PGRFA.

## 1.2. Gaps or constraints identified

There is a substantial gap between the material known to be held by ECPGR WG members and curators, and the material currently listed in EURISCO. Under the project FRUITTREEDATA, approved for funding during the 5th Call for Proposals of the ECPGR Grant Scheme, a joint effort to resolve this gap will increase and update the listing of available material within EURISCO and/or establish the reasons for the lack of inclusion of known material in National Lists.

Another constraint is related to the reduced number of accessions flagged as AEGIS, one of the reasons being the unknown/not high-quality phytosanitary status of many traditional varieties that have been long propagated vegetatively.

## 2. GRANT SCHEME ACTIVITIES, WG MEETINGS AND EVA ACTIVITIES

- **Grant Scheme proposals (submitted:1; approved:1 (November 2021))**  
[Improvement of Fruit Tree Data Inclusion in EURISCO \(FRUITTREEDATA\)](#) (in collaboration with the *Malus/Pyrus* WG; 5<sup>th</sup> call)
- **Total number of partners involved: 15 from 11 countries**
  - ECPGR-funded: 12 from 11 countries
  - Self-funded: 3 from 3 countries
- **Meetings held**  
Prunus Alignment (Phase IX) meeting, 18 February 2020, Athens, Greece
- **Reports and related data**
  - [Prunus Alignment \(Phase IX\) Final Activity Report](#) (2021)
  - [EU.CHERRY \(Phase IX\) Final Activity Report](#) (2019)
- **Funds mobilized** [shared with *Malus/Pyrus* WG]
  - ECPGR granted funds: € 38,775
  - Inputs in-kind declared in Grant activities: € 36,000

## 3. OTHER ACTIVITIES (CROSS-WORKING GROUP ACTIVITIES, LINKS WITH OTHER NETWORKS, INTERNATIONAL PROJECTS AND INITIATIVES)

- **Cross-Working Group activities:**  
Due to the evident affinity between the crops of pertinence and, as a result, of challenges, objectives, and strategies, there has always been a particularly close relationship with the *Malus/Pyrus* WG. The presentation of the collaborative FRUITTREEDATA project, which is intended to be initiated soon, is an example of such closeness and interest convergence.

**International Projects:** Some members/Institutions of the two WGs are currently collaborating in the Innobreed project (Innovative Organic Fruit Breeding and uses), 2022-2026, funded by the EU. Among the aims of this project, the identification of ideotypes of perennial fruit GRs (apple, pear, peach, cherry, plum, apricot) more resilient/robust/tolerant to diseases/adaptable to organic production and better meeting organic farming requirements. Moreover, the evaluation and valorization of underutilized local old genetic resources (cultivars and landraces) is also contemplated, as well as their use in breeding for more robust cultivars. New, more comprehensive guidelines including traits specific for identifying more robust germplasm are being developed, and the results will be of benefit to ECPGR too.

### Working Group documents and publications

- Barreneche, T.; Cárcamo de la Concepción, M.; Blouin-Delmas, M.; Ordidge, M.; Nybom, H.; Laciš, G.; Feldmane, D.; Sedlak, J.; Meland, M.; Kaldmäe, H.; et al. SSR-Based Analysis of Genetic Diversity and Structure of Sweet Cherry (*Prunus avium* L.) from 19 Countries in Europe. *Plants* 2021, 10, 1983. <https://doi.org/10.3390/plants10101983>
- Ordidge M. et al. 2021. Towards a Joint International Database: Alignment of SSR Marker Data for European Collections of Cherry Germplasm. *Plants*, 10(6):1243. <https://doi.org/10.3390/plants10061243>
- Nybom H, Laciš G 2021. [Recent Large-Scale Genotyping and Phenotyping of Plant Genetic Resources of Vegetatively Propagated Crops](#). *Plants*, 10, 415. <https://doi.org/10.3390/plants10020415>
- Pinosio S et al. 2020. A draft genome of sweet cherry (*Prunus avium* L.) reveals genome-wide and local effects of domestication. *The Plant Journal*, 103, 1420-1432. <https://doi.org/10.1111/tbj.14809>
- Gaši F, Sehic J, Grahic J et al. 2020. Genetic assessment of the pomological classification of plum *Prunus domestica* L. accessions sampled across Europe. *Genetic Resources and Crop Evolution*. <https://doi.org/10.1007/s10722-020-00901-y>
- Nybom, H., Giovannini, D., Ordidge, M., Hjeltnes, S. H., Grahić, J. and Gaši, F. (2020) "ECPGR recommended SSR loci for analyses of European plum (*Prunus domestica*) collections", *Genetic Resources*, 1(1), pp. 40-48. [doi: 10.46265/genresj.2020.1.40-48](https://doi.org/10.46265/genresj.2020.1.40-48).
- Xanthopoulou A et al. 2020. Whole genome re-sequencing of sweet cherry (*Prunus avium* L.) yields insights into genomic diversity of a fruit species. *Horticulture Research*, 7:60. <https://doi.org/10.1038/s41438-020-0281-9>
- Sehic J, Gaši F, Benedikova D et al. 2019. Genetic diversity of *Prunus domestica* L. selected from ten countries across Europe. *Acta Horticulturae* 1260:159-162 DOI: [10.17660/ActaHortic.2019.1260.25](https://doi.org/10.17660/ActaHortic.2019.1260.25)
- Ordidge M. et al. 2019. [Prunus Alignment – integrating data for European plum and cherry germplasm](#) (863,9 KB). Poster presented at the XV EUCARPIA Fruit Breeding and Genetics Symposium, 3-7 June 2019, Prague – Suchdol, Czech Republic.

#### **4. EXPECTED ADDITIONAL ACHIEVEMENTS AND FUTURE ACTIVITIES THAT COULD CONTRIBUTE TO THE IMPLEMENTATION OF THE PGR STRATEGY FOR EUROPE**

- Increased phenotyping characterization and evaluation of European *Prunus spp.* PGRs, including traits useful to identify more robust germplasm, both for direct use or for future breeding actions
- Increased collaboration/coordination with the Documentation and Information WG for increasing and updating the available material within EURISCO, providing easier access to information about *Prunus* GRs conserved in the EU.