

**Identification of a representative set of
Prunus domestica accessions of European origin,
well documented and characterized,
to be included into the AEGIS system
(PRUNDOC)**

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Activity Report

CONTENTS

| | |
|---|----------|
| INTRODUCTION | 1 |
| MATERIAL AND METHODS | 1 |
| RESULTS..... | 2 |
| RECOMMENDATIONS | 3 |
| BIBLIOGRAPHY | 4 |
| ANNEX I. FIRST PRIORITY DESCRIPTORS FOR PRUNDOC | 5 |
| ANNEX II. PLUM (<i>PRUNUS</i> SPP.) ACCESSIONS DESCRIBED IN PRUNDOC..... | 6 |

Identification of a representative set of *Prunus domestica* accessions of European origin, well documented and characterized, to be included into the AEGIS system (PRUNDOC)

Activity Report

INTRODUCTION

Following the ECPR Call for Activity proposals in 2014, Daniela Giovannini, Chair of the *Prunus* WG, invited all members of the WG to present project ideas for the Call. Of the proposals presented, that of Stein Harald Hjeltnes to establish PRUNDOC was selected. The project content was mainly worked out by these two members, and an invitation to take part was sent out to the WG *Prunus* members. A total of nine partners signed an Expression of Interest. In addition, the Chair of the *Malus/Pyrus* WG, Marc Lateur, was included in the group as self-funded partner (see partners' details in [Activity Proposal](#)). This was highly appreciated in order to take advantage of possible synergic effects with the ECoHisPy project, led by Marc Lateur and presented by the *Malus/Pyrus* WG in the same Call. During the project, the Swedish University of Agricultural Sciences (SLU) Balsgård offered data as a self-funded partner.

PRUNDOC was accepted by the ECPGR Steering Committee in December 2015.

According to the AEGIS website, three of the nine original partner countries have not yet signed the AEGIS Memorandum of Understanding (MoU), namely France, Greece and Serbia. Consequently, the accessions from these countries cannot be flagged as part of the European Collection until the MoU has been signed.

MATERIAL AND METHODS

The PRUNDOC partners agreed that a meeting to specify the work and protocols was necessary, and all partners were asked to present their candidates for inclusion into the European Collection at this meeting, that was held 20-21 April 2015 in Leuven, Belgium. Services for arranging the meeting were provided by ECPGR Secretariat. All presentations, protocols, Excel sheets, etc. were uploaded to Dropbox, in order to obtain a common platform to find these key resources. In addition emails with revision of documents were sent to the partners whenever situations occurred that required action.

Accessions that were selected from the partners were *Prunus domestica* selections of domestic origin, with long growing history. A few *Prunus cerasifera* accessions were added by the Slovak partner, and two cultivars of Estonian origin were offered for phenological description by the Latvian partner. The partners offered from 3 to 16 accessions for full description, and a total of approximately 100 accessions were selected. Some of the cultivars selected are still being commercially propagated by nurseries; however they are included into the European *Prunus* database and the National Coordinators have to define if they meet the criteria for the European Collection.

For SSR analyses the laboratory at the Swedish University of Agricultural Sciences (SLU) Balsgård, was selected, as this laboratory and collaborators had recently published work on genotyping of *Prunus domestica* germplasm (Sehic et al. 2015a, 2015b). Leaf samples of an agreed number of accessions were sent to the laboratory in May-June 2015 according to specifications given by the lab. Due to the costs of running accurate analyses and evaluation of bands of the samples, the budget covered 36 accessions, and the decision regarding the number of accessions that could be analysed for each partner was made at the project meeting in Leuven.

The phenotyping was carried out according to the IBPGR/CEC descriptors (Cobianchi and Watkins 1984), Szalatnay and Bauermeister (2006) and UPOV (1977) as specified in Annex I (page 5). Photographs in the field were carried out following an agreed method where a piece of white paper was held below the fruits when taking the picture, and an example picture was distributed to illustrate how close one should take the picture. The pictures of fruits in the laboratory were taken according to specifications given by Szalatnay and Bauermeister (2006).

Identification of a representative set of *Prunus domestica* accessions of European origin, well documented and characterized, to be included into the AEGIS system (PRUNDOC)

Activity Report

RESULTS

The plans made at the meeting in Leuven had to be adapted during the course of the project. The Austrian partner could not participate and had to withdraw. Regarding phenological descriptor data, a few accessions could not be described due to lack of fruits. Regarding the SSR analysis, the number of accessions was increased from 3 to 4 for some partners to make full use of the original budget which covered samples from Austria.

The final numbers of accessions phenotyped and delivered for SSR are given in Table 1. More details on the phenotyped accessions are available in Annex II to this report, and in the Excel table available online ([here](#)).

Table 1. Number of plum accessions described in PRUNDOC according to standards

| Country | Number of accessions | | Comments |
|-----------------------------|----------------------|-------------------|---|
| | Phenotyped | Delivered for SSR | |
| France | 18 | 4 | Two of the four accessions for SSR do not belong to the group of phenotyped accessions |
| Germany | 7 | 4 | Accessions phenotyped included one accession of Czech origin + 6 accessions with only passport data |
| Greece | 7 | 4 | |
| Italy | 14 | 4 | |
| Latvia | 8 | 4 | Accessions phenotyped included two accessions of Estonian origin One of the SSR accessions does not belong to the group of phenotyped accessions |
| Norway | 5 | 3 | |
| Serbia | 11 | 4 | |
| Slovakia | 10 | 4 | Accessions delivered for SSR included one <i>cerasifera</i> and three <i>domestica</i> |
| Sweden | 5 | 1 | Self-funded partner The SSR accession does not belong to the group of phenotyped accessions |
| Total | 85 | 32 | |
| Belgium | (6) | (6) | Self-funded partner Data not delivered yet |
| Final total expected | 91 | 38 | |

Except for Belgian data, all data and pictures were sent to the European *Prunus* Database in Bordeaux, France (<http://www.bordeaux.inra.fr/euplumdb/>). Data will be uploaded in the EPDB by the database manager after reception of the data from Belgium.

Identification of a representative set of *Prunus domestica* accessions of European origin, well documented and characterized, to be included into the AEGIS system (PRUNDOC)

Activity Report

The partners were asked to send these data also to their National Focal Points for uploading in the EURISCO catalogue.

According to the Activity Proposal it was expected that the WG Chair, together with the project team, make a list of Most Appropriate Accessions (MAAs) to be flagged as AEGIS accessions. As the phytosanitary requirements could not be met by the collections of the project partners, this could not be achieved.

The PRUNDOC project was presented at the III EUFRIN Plum and Prune Working Group Meeting on Present Constraints of Plum Growing in Europe at Skopelos, Greece, 20-21 August 2015, and the manuscript will be published in an issue of *Acta Horticulturae*.

Expected products and final results

The “expected products/results” from PRUNDOC specified in the Activity proposal were partially fulfilled, as below:

- The list of First Priority Descriptors (FPDs) to describe plum accessions of the European Collection was agreed (see [Minutes of the PRUNDOC meeting in Leuven](#)).
- The total number of accessions described was slightly lower than the expected 100: at time of finalising this report, 85 accessions were verified, characterized according to FPDs and prepared for uploading into the European *Prunus* Database and in EURISCO (see Annex II); this total should increase to 91 accessions upon reception of data for the 6 accessions from Belgium.
- Data uploads to the EPDB and EURISCO are yet to be performed.
- The expected “Guidelines for developing a Plum-specific procedure for the selection of MAAs, to be extended in future to other *Prunus* species” could not be prepared as PRUNDOC did not succeed in reaching consensus on the selection process of MAAs. All clonally propagated fruit crops have the same challenges in how to select accessions to be flagged as belonging to the European Collection due to a wide range of synonyms and homonyms. The specific guidelines should include precise protocols to be followed for proper verification of synonyms and homonyms.
- Establishment of a network for further work on characterization and evaluation of plum genetic resources: PRUNDOC partners have published and will publish data from the project, and present results from the project at international conferences. These activities will stimulate partners to participate in new projects, and motivate new partners to take part.

RECOMMENDATIONS

PRUNDOC had few partners compared to the total number of members in the *Prunus* WG. Important plum germplasm holding countries like Romania and UK were not partners in the project, and more countries should be included in future projects.

Identification of a representative set of *Prunus domestica* accessions of European origin, well documented and characterized, to be included into the AEGIS system (PRUNDOC)

Activity Report

PRUNDOC had a project start-up meeting, and it is advisable for this kind of projects to arrange this kind of meeting, with a defined agenda including presentations from each member where the suggested contribution is specified.

The amount of money for this kind of projects is extremely small to expect any significant outcome, and a large in-kind contribution is required. This kind of projects will however stimulate taking small steps and bridging the partner institutes. It should be noted that for clonally propagated fruit crops the issue of the requirements and actions to be taken for the inclusion of accessions into the European Collection should be followed-up as they do not seem to be clearly understood at the collection curator's level for field collections.

BIBLIOGRAPHY

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- Szalatnay D, Bauermeister R. 2006. [Obst-Deskriptoren NAP / Descripteurs de fruits PAN](#). Agroscope Changins-Wädenswil ACW and Vereinigung FRUCTUS. Stutz Druck AG, Wädenswil, Switzerland. 89pp
- UPOV. 1977. Guidelines for the conduct of tests for distinctness, homogeneity and stability. European plum (fruit varieties, rootstocks excluded). UPOV, Geneva.

Identification of a representative set of *Prunus domestica* accessions of European origin, well documented and characterized, to be included into the AEGIS system (PRUNDOC)

Activity Report

ANNEX I. FIRST PRIORITY DESCRIPTORS FOR PRUNDOC

| Descriptor name | References(*) | Details |
|--|----------------------|--|
| Phenology: time of beginning of flowering | (2) | Time of beginning of flowering (1-9 numbered scale) using stage BBCH61 |
| Phenology: time of beginning of fruit ripening | (2) | Season of maturity for picking (1-9 numbered scale) using stage BBCH89 |
| Fruit: size | (1) | Average weight of fruit (1-9 numbered scale) |
| Fruit: shape (in lateral view) | (1) | Fruit shape (1-9 numbered scale) |
| Fruit: skin ground colour (after removing bloom) | (1) | Colour of the skin of fully mature fruits (1-9 numbered scale) |
| Fruit: skin overcolour (after removing bloom) | (1) (2) | Over colour of the skin (1-9 numbered scale) |
| Fruit: colour of flesh | (1) (3) | Colour of flesh (1-9 numbered scale) |
| Fruit: degree of adherence to flesh | (2) | Stone adherence to flesh (1-3 numbered scale) |
| Fruit: eating quality (global taste) | (2) | At optimum eating time (1-9 numbered scale) |
| Fruit: sensorial analysis of sugar/acid ratio | (1) | Subjective assessment (1-9 numbered scale) |
| Fruit: flesh firmness | (1) (2) | Subjective assessment (1-9 numbered scale) |
| Stone: shape (in lateral view) | (1) | Stone shape in lateral view (1-9 numbered scale) |

(*) References (see above, Bibliography for full citations)

(1) Szalatnay and Bauermeister 2006

(2) Cobianchi and Watkins 1984 (IBPGR descriptors)

(3) UPOV 1977

Identification of a representative set of *Prunus domestica* accessions of European origin, well documented and characterized, to be included into the AEGIS system (PRUNDOC)

Activity Report

ANNEX II. PLUM (*PRUNUS* SPP.) ACCESSIONS DESCRIBED IN PRUNDOC

For full data see Excel file, available online ([here](#)).

Notes:

- All accessions are *P. domestica* except for the three accessions marked (*).

- Accessions analysed for SSR are highlighted in green.

Some additional accessions were also analysed for SSR but are not included in this list (6 accessions from Belgium, 2 from France, 1 from Latvia and 1 from Sweden). A poster on SSR data was presented at the XIth International Symposium on Plum and Prune Genetics, Breeding and Pomology held 17-21 July 2016 in Freising-Weihenstephan, Germany (poster also available online [here](#)).

- Full names of institutes are listed at the end of the table.

| Country of the holding institute | Institute code | Accession number | Accession name |
|----------------------------------|----------------|------------------|---------------------------------|
| France | FRA057 | P0062 | Abricotée Jaune |
| | FRA057 | P0072 | Mirabelle Parfumée de Septembre |
| | FRA057 | P0302 | Impériale Murat |
| | FRA057 | P0328 | Madame Guttin |
| | FRA057 | P0389 | Reine-Claude Davion |
| | FRA057 | P0410 | Quetsche de Wagenstadt |
| | FRA057 | P0449 | Impériale Epineuse |
| | FRA057 | P0812 | Double Robe |
| | FRA057 | P1671 | Verdanne |
| | FRA057 | P1808 | De Montfort |
| | FRA057 | P2737 | Prune de Vars |
| | FRA057 | P3344 | Prune de Chien |
| | FRA057 | P3692 | Bonjour |
| | FRA057 | P3705 | Saint Léonard |
| | FRA057 | P3720 | Oustenque bleue (Dupuy) |
| | FRA057 | P3726 | Prune de Chien |
| | FRA057 | P3764 | Briquetch |
| | FRA057 | P3768 | Madame Bonnard |
| Germany | DEU451 | PFL0011 | Graf Althanns Reneklode |
| | DEU451 | PFL0012 | Gräfin Cosel |
| | DEU451 | PFL0014 | Haferpflaume |
| | DEU451 | PFL0002 | Bühler Frühzwetsche |
| | DEU451 | PFL0010 | Ersinger Frühzwetsche |
| | DEU451 | PFL0030 | Ruth Gerstetter |
| | DEU451 | PFL0022 | Flotows Mirabelle |
| Greece | GRC012 | PD0003 | Mpardaki elliptic |
| | GRC012 | PD0004 | Mpardaki circular |
| | GRC012 | PD0005 | Glyka Skopelou |
| | GRC012 | PD0006 | Ksina Skopelou |
| | GRC012 | PD0007 | Avgata Skopelou |
| | GRC012 | PD0001 | Asvestochoriou |
| | GRC012 | PD0002 | Praousti |

Identification of a representative set of *Prunus domestica* accessions of European origin, well documented and characterized, to be included into the AEGIS system (PRUNDOC)

Activity Report

| Country of the holding institute | Institute code | Accession number | Accession name |
|----------------------------------|----------------|------------------|----------------------------|
| Italy | ITA380 | 249 | Sighera |
| | ITA380 | 59 | Caleca |
| | ITA380 | 196 | Paradisu |
| | ITA380 | 214 | Prunella |
| | ITA380 | 240 | Sanacore |
| | ITA380 | 189 | Muninca |
| | ITA380 | 220 | Ramassin Giallo |
| | ITA380 | 62 | Cariadoggia |
| | ITA380 | 438 | Agostana |
| | ITA380 | 216 | Ramassin |
| | ITA380 | 219 | Ramassin di Pagno |
| | ITA380 | 128 | Gaiotti 1 |
| | ITA380 | 147 | Lazzarinu |
| | ITA380 | 264 | Susino Secondo |
| Latvia | LVA015 | LVA01010 | Latvijas Dzeltēnā Olplūme |
| | LVA015 | LVA01009 | Lāse |
| | LVA015 | LVA01013 | Latvijas Sarkanā Olplūme |
| | LVA015 | LVADPru2 | Julius |
| | LVA015 | LVA01006 | Aizputes |
| | LVA015 | LVA02549 | Zilā Lāse |
| | LVA015 | LVA01008 | Kārsavas |
| | LVA015 | LVADPru1 | Suhkruploom |
| Norway | NOR053 | 255 | Edda |
| | NOR053 | 1389 | Eikerplomme |
| | NOR053 | 1429 | Helgøypomme |
| | NOR053 | 1398 | Tråneplomme |
| | NOR053 | 1422 | Blåplomme frå Lier |
| Serbia | SRB028 | PD 0102 | Zlatka |
| | SRB028 | PD 0201 | Crvena ranka |
| | SRB028 | PD 0204 | Govedaca |
| | SRB028 | PD 0207 | Turgulja |
| | SRB028 | PD 0203 | Rosička zutka |
| | SRB028 | PD 0205 | Gorcivka |
| | SRB028 | PD 0206 | Metlas |
| | SRB028 | PD 0101 | Pozegaca |
| | SRB028 | PD 0103 | Cacanska lepotica |
| | SRB028 | PD 0104 | Cacanska rodna |
| | SRB028 | PD 0202 | Moravka |
| Slovakia | SVK001 | svk-prundoc-004 | MY-BO-1 (*) |
| | SVK001 | svk-prundoc-010 | MY-VS-1 (*) |
| | SVK001 | svk-prundoc-001 | Kozlienka |
| | SVK001 | svk-prundoc-002 | Trencianska okruhlicka |
| | SVK001 | svk-prundoc-003 | S-BO-1 |
| | SVK010 | svk-prundoc-007 | Droblienka |
| | SVK010 | svk-prundoc-005 | Tina |
| | SVK010 | svk-prundoc-008 | Duranzia |
| | SVK010 | svk-prundoc-009 | Myrobalan z Obdokoviec (*) |
| | SVK010 | svk-prundoc-006 | Edita |

Identification of a representative set of *Prunus domestica* accessions of European origin, well documented and characterized, to be included into the AEGIS system (PRUNDOC)

Activity Report

| Country of the holding institute | Institute code | Accession number | Accession name |
|----------------------------------|----------------|------------------|----------------|
| Sweden | SWE051 | BAL BF0229 | Hackman |
| | SWE051 | BAL BF0243 | Ive |
| | SWE051 | BAL BF0337 | Opal |
| | SWE051 | BAL BF0237 | Herman |
| | SWE051 | BAL BF0249 | Jubileum |

(*) = *P. cerasifera*

Decoded institute codes

| Country | INSTCODE | Full name |
|----------|----------|--|
| France | FRA057 | French National Institute for Agricultural Research (INRA), Fruit Research Station of Bordeaux |
| Germany | DEU451 | Julius Kühn-Institut, Federal Research Centre for Cultivated Plants |
| Greece | GRC012 | Institute of Plant Breeding and Genetic Resources, Department of Deciduous Fruit Trees in Naoussa |
| Italy | ITA380 | Consiglio per la Ricerca in agricoltura e l'analisi dell'Economia Agraria, Unità di ricerca per la Frutticoltura di Forlì (CREA-FRF) |
| Latvia | LVA015 | Latvia State Institute of Fruit-Growing |
| Norway | NOR053 | Njoes naeringsutvikling |
| Serbia | SRB028 | Faculty of Agriculture, University of Novi Sad |
| Slovakia | SVK001 | Plant Production Research Institute Piešťany |
| Slovakia | SVK010 | Research Institute of Fruit and Ornamental Plants Bojnice |
| Sweden | SWE051 | Department of Plant Biology, Swedish Agricultural University |