Update on the activities of the AEGIS sub-group on *Prunus*

AEGIS model crops curators and dbs managers meeting
1-3 July 2008, Radzików, Poland

Emilie Balsemin
- Genetic Resources Centre for *Prunus* species. Fruit Research Station (UREF) INRA Bordeaux

Daniela Giovannini
- Fruit Crop Research Unit, Forli (CRA-FRF)
Participants for *Prunus*:

- Janos Apostol (Hungary)
- Emilie Balsemin (EPDB manager, France)
- Daniela Giovannini (Italy)
- Kenneth Tobutt (UK)

Reasons to choose *Prunus* as model crop:

- Multicrop, important to Europe
- Perennial, vegetatively propagated
- Non Annex I crop of the IT DB relatively advanced

Model species for *Prunus*: cherry (*P. avium*)

Decentralised System

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8° Meeting of the ECPGR Prunus Working Group, 7-9 September 2010, Forlì, Italy

Photo: Audrey Didier
Expected outputs

1. Criteria for MAA identification and procedure
2. Draft list of MAA
3. (AQUAS) AEGIS Quality System - draft crop guidelines
4. Proposed workplan for implementation
5. Estimate costs for implementation

Photo: Audrey Didier

8° Meeting of the ECPGR Prunus Working Group, 7-9 September 2010, Forlì, Italy
1. Criteria for MAA identification and procedure

AEGIS Selection Criteria

Primary, **Crop Aspecific**

- In the public domain (offered)
- Originated in Europe/important to Europe
- Genetically unique
- Plant genetic resources as defined in the IT

**Crop Specific**

1A. Choice of genotypes

2B. Choice of MAA of these genotypes

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AEGIS Prunus group recommendation: no prioritization
1B. Choice of MAA of these genotypes

- Maintained in ‘country of origin’
- Of known origin, whether collected or bred
- Accompanied by passport information (EURISCO multi-crop passport descriptors)
- Of high health status, e.g. virus-free
- Accompanied by morphological and/or molecular characterization data
- Accompanied by agronomic evaluation data
- Correctly named (in perennial clonal crops synonyms/homonyms are frequent)
Bottle-necks

**Accession offer**

Country must sign MoU

**Health status**

Of high health status, e.g. virus-free

Explore “*In vitro*” systems as a way of maintaining clean accessions virus-free

**Denomination**

Correctly named (in perennial clonal crops synonyms/homonyms are frequent)

Characterisation data & Photos

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### Bottle-necks

Accompanied by passport information (EURISCO multi-crop passport descriptors)

<table>
<thead>
<tr>
<th>Description level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCENAME</td>
</tr>
<tr>
<td>ORIGCTY</td>
</tr>
<tr>
<td>INSTCODE</td>
</tr>
<tr>
<td>SPECIES</td>
</tr>
</tbody>
</table>

Minimum passport & recommended data

- **Obligatory**
  - ACCENUMB
  - ACQDATE
  - DONORCODE & DONORDESCR
  - DONORNUMB
  - OTHERNUMB
  - BREDNUMB & BREDDESCR
  - IDENTIF (*Prunus* specific descriptor)
  - VIRUSTATUS & VIRUSDATE (*Prunus* specific descriptors)

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2. Draft List of MAA

- Update current database (EPDB Manager)
- Collate data of the accessions (EPDB Manager)
- Nominate Primary and Reserve AEGIS accession (EPDB Manager + ECPGR WG (or appointed sub-group))
- Register the AEGIS status and motivate choice (EPDB Manager)
- Notify Collection Responsible and AEGIS Secretariat (EPDB Manager)

This procedure is applicable after MoU signature
The list of Primary & Reserve accessions is dynamic, according to inclusion of new collections to AEGIS
In 2008, the generation of a preliminary list of MAAs has been put into practice in advance of the implementation of AEGIS, using the EPDB as a tool.

2,731 sweet cherry accessions registered in EPDB in 2008

Process?

Draft list of 1,483 MAAs
2A. List of MAAs generated for Prunus based on the EPDB: Choice of genotypes, using primary selection criteria

2,731 sweet cherry accessions registered in EPDB in 2008

668 accessions were excluded:
- 267 unnamed accessions
- 70 protected cultivars
- 259 UPOV ref. cultivars from Non-European countries
- 5 mislabelled accessions
- 67 others

2,063 preselected sweet cherry accessions for AEGIS

EPDB descriptors used for the selection

- ACCENAME: accession name
- ORIGCTY: country of origin
- SPECIES [only Prunus avium]
- PROTECT: protection status [No]
- EUCOLL: Belonging to the European Collection? [Yes]

8° Meeting of the ECPGR Prunus Working Group, 7-9 September 2010, Forlì, Italy
2A. List of MAAs generated for *Prunus* based on the EPDB: Choice of genotypes, analysing duplicates

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2,731 sweet cherry accessions registered in EPDB in 2008

**668 accessions were excluded:**
- 267 unnamed accessions
- 70 protected cultivars
- 259 from Non-European countries
- 5 mislabelled accessions
- 67 others

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2,063 preselected sweet cherry accessions for AEGIS

**1,116 unique accessions**

**947 other accessions**

Analysed by the Cherry experts during the Fruit Synonyms meeting (CRA-W, Gembloux, 2008)

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How many unique genotypes?

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8° Meeting of the ECPGR Prunus Working Group, 7-9 September 2010, Forlì, Italy
2A. List of MAAs generated for *Prunus* based on the EPDB: Choice of MAAs, resolving synonyms problems

**2,731 sweet cherry accessions registered in EPDB in 2008**

668 accessions were excluded:
- 267 unnamed accessions
- 70 protected cultivars
- 259 from Non-European countries
- 5 mislabelled accessions
- 67 others

**2,063 preselected sweet cherry accessions for AEGIS**

1,116 unique accessions

1,116 unique genotypes

947 other accessions

367 duplicate groups

- 302 in > 1 country
- 65 in 1 country

1,116 unique accessions + 367 MAAs after using secondary selection criteria

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8° Meeting of the ECPGR Prunus Working Group, 7-9 September 2010, Forlì, Italy
2A. List of MAAs generated for *Prunus* based on the EPDB: Choice of MAAs, using secondary selection criteria

<table>
<thead>
<tr>
<th>Secondary selection criteria</th>
<th>EPDB descriptors effectively used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintained in ‘country of origin’</td>
<td>YES</td>
</tr>
<tr>
<td>Of known origin, whether collected or bred</td>
<td>YES</td>
</tr>
<tr>
<td>Accompanied by passport information (EURISCO multi-crop passport descriptors)</td>
<td>YES</td>
</tr>
<tr>
<td>Of high health status, e.g. virus-free</td>
<td>YES</td>
</tr>
<tr>
<td>Accompanied by morphological and/or molecular characterization data</td>
<td>YES</td>
</tr>
<tr>
<td>Accompanied by agronomic evaluation data</td>
<td>YES</td>
</tr>
<tr>
<td>Correctly named (in perennial clonal crops synonyms/homonyms are frequent)</td>
<td>YES</td>
</tr>
</tbody>
</table>

8° Meeting of the ECPGR Prunus Working Group, 7-9 September 2010, Forlì, Italy
2A. List of MAAs generated for *Prunus* based on the EPDB:
Draft list of sweet cherry MAAs

2,731 sweet cherry accessions registered in EPDB in 2008

668 accessions were excluded:
- 267 unnamed accessions
- 70 protected cultivars
- 259 from Non-European countries
- 5 mislabelled accessions
- 67 others

2,063 preselected sweet cherry accessions for AEGIS

1,116 unique accessions

1,116 unique genotypes

947 other accessions

367 genotypes

Fruit Synonyms meeting
(Gembloux, 2008)

Draft list of 1,483 MAAs (+367 reserve accessions)

8° Meeting of the ECPGR Prunus Working Group, 7-9 September 2010, Forlì, Italy
2A. List of MAAs generated for *Prunus* based on the EPDB: Analysing the draft list of sweet cherry MAAs

60% of MAAs were maintained by their country of origin

**Draft list of MAAs for sweet cherry – host countries and countries of origin**

- This list will be revised after the update of the data sets and probably after the signature of MoU
2B. Experiences with the use of the selection criteria while establishing the list of sweet cherry MAAs

ADVANTAGES
😊 EPDB easy to use for the application of selection criteria

😊 6 useful passport descriptors:
• Accession name
• Synonyms
• Country of origin
• Holding institute
• Donor institute
• Protection status

LIMITS
戽 No countries had yet offered accessions to AEGIS
⇒ All the countries should sign the MoU

戽 Lack of participation of some countries in the EPDB: important Prunus collections are not in contact with the EPDB

戽 Problems of synonymy and trueness-to-name
⇒ Clarification of the existing synonyms and homonyms is very important to help identify the MAAs to be included in AEGIS

戽 Lack of adequate information could be bottle-neck in selection process: MAAs could not easily be selected if candidates accessions had no-comparable data sets
3. AQUAS (AEGIS Quality System) - draft crop guidelines

PDCA approach

- **PLAN** – say what you do
  - Definition of “minimum technical standards”
  - Agreement

- **DO** – do what you say
  - Acceptance of standards
  - Implementation of agreed standards

- **CHECK** – let check that you do what you say
  - Self-checking
  - External checking

- **ACT** – correct and improve what you say you do
  - Arrange capacity building
  - Improve and suggest improvements

**ACTORS**

- **AEGIS WG**
- **Prunus WG**

- **NCs and curators by MoU signature**
  - participating curators

- **curators**
  - by curators when requested

- **NCs**
  - participating curators

AQUAS should be realistic and based on the principle of consensus

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Receipt & propagation of new AEGIS material

- Receipt with a minimum passport data + phytosanitary docs + MTA
- Add to genebank register and give the accession a number
- Propagate onto virus-tested rootstocks and label correctly
- Provide the passport data to EPDB manager
Maintenance of AEGIS accessions

- Four trees (2+2) per accession (isolation not obligatory)
- Suitable planting site and tree management
- Label and map
- Periodically inspected, visually and/or with tests
Prunus (cherry) minimum technical standards proposed by AEGIS Prunus group (to be endorsed by Prunus WG)

Re-propagation of AEGIS accessions

- Correct labelling
- Virus-tested compatible rootstocks
- New plants authenticated by traceability procedures or morphological inspection or fingerprinting
Prunus (cherry) minimum technical standards proposed by AEGIS Prunus group (to be endorsed by Prunus WG)

Despatch & disposal

- Two sticks per accession
- Despatch with labels and minimum passport data, phytosanitary doc and MTA
- Two-years notice before withdrawal (??to EPDB, or National Coordinator, or AEGIS Secretariat)
Characterization (if funded)

- Using the Prunus WG Descriptors
- Using SSRs agreed at the East Malling workshop (2006) for Molecular characterization
- Photos of the fruits according to the Gembloux protocol (2008)
- Supply data to the DB Manager for inclusion in EPDB

Prunus (cherry) minimum technical standards proposed by AEGIS Prunus group (to be endorsed by Prunus WG)
### 4. Proposed workplan for implementation of AEGIS for *Prunus*

<table>
<thead>
<tr>
<th>Activities</th>
<th>By whom?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Complete minimum passport data in EPDB</td>
<td>Curators and DB_M</td>
</tr>
<tr>
<td>2. Choose genotypes for AEGIS</td>
<td>DB_M?</td>
</tr>
<tr>
<td>3. Choose MAAs (primary + reserve if available)</td>
<td>Cherry commitee</td>
</tr>
<tr>
<td>4. Propagate safety duplicates where necessary and plant them (where?)</td>
<td>Curators, D_BM</td>
</tr>
<tr>
<td>5. Check the identity of primary and reserve accessions: ie photo, morphological, molecular</td>
<td>Relevant curators</td>
</tr>
<tr>
<td>6. Check health status of chosen accessions and notify DB_M</td>
<td>Relevant curators, DB_M</td>
</tr>
<tr>
<td>7. Update AEGIS MAAs list and acquire new candidates</td>
<td>DB_M, relevant curators</td>
</tr>
<tr>
<td>8. Implement <strong>realistic</strong> AQUAS in relevant genebanks</td>
<td>Relevant curators</td>
</tr>
<tr>
<td>9. Distribute material in response to requests</td>
<td>Relevant curators</td>
</tr>
</tbody>
</table>

More….
Meetings, publications, newsletters, seeking funding
Encourage National genebanks involvement & promote AEGIS to potential users (NC)
5. Estimate costs for implementation of AEGIS (cherry)

<table>
<thead>
<tr>
<th>Action</th>
<th>Carried out by</th>
<th>Estimated cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meetings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inauguration meeting</td>
<td>Participating curators and AEGIS group</td>
<td>25,000€</td>
</tr>
<tr>
<td>1-year review meeting</td>
<td>Participating curators and AEGIS group</td>
<td>25,000€</td>
</tr>
<tr>
<td>3-year review meeting</td>
<td>Participating curators and AEGIS group</td>
<td>25,000€</td>
</tr>
<tr>
<td>Data enhancement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passport, morphological data and photos for about 1850 MAAs</td>
<td>Participating curators</td>
<td>10€ per accession + 1,500€ for other needs (20,000€)</td>
</tr>
<tr>
<td>Fingerprinting of about 1850 MAAs</td>
<td>Several laboratories</td>
<td>25€ per accession (46,250€)</td>
</tr>
<tr>
<td>Health status monitoring</td>
<td>Several laboratories</td>
<td>25€ per accession (46,250€)</td>
</tr>
<tr>
<td>Safety duplication of 1200 accessions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propagation of safety duplicates</td>
<td>Curators or nurseries</td>
<td>7€ per accession (8,400€)</td>
</tr>
<tr>
<td>Establishing orchard (2x1200 trees) probably at a single site</td>
<td>Curators</td>
<td>30 to 50€ per accession (48,000€ approx.)</td>
</tr>
<tr>
<td>Publicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publications and newsletter</td>
<td></td>
<td>5,000€</td>
</tr>
<tr>
<td>Promotion (12 countries)</td>
<td></td>
<td>6,000€</td>
</tr>
</tbody>
</table>

**ESTIMATED TOTAL AMOUNT approx. 250,000 €**
Warsaw, Castle’s square

Photo: Audrey Didier