



Photos: Audrey Didier



A European Genebank Integration System



## 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, Forlì (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

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

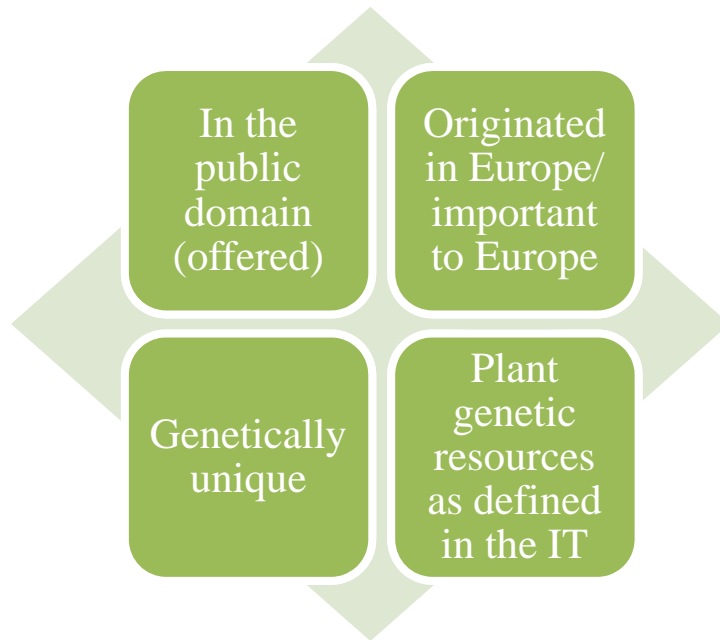


Photo: Audrey Didier



## 1. Criteria for MAA identification and procedure

### AEGIS Selection Criteria Primary, Crop Aspecific



### Crop Specific

1A. Choice of genotypes

2B. Choice of MAA of these genotypes



1A. Choice of genotypes: categories to be considered for AEGIS



Traditional cultivars and/or landraces



Old and/or obsolete cultivars



Modern cultivars, bred conventionally



Significant breeding lines



Genetic stocks, mutants and seedlings of mapping progenies



Crop wild relatives

**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



Maintained in the country of origin

**Accession offer**

Country must sign MoU



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

**Health status**

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



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

**Denomination**

Characterisation data & Photos



## Bottle-necks



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

**Description level**

**Minimum  
passport &  
recommended  
data**

obligatory

ACCENAME  
ORIGCTY  
INSTCODE  
SPECIES

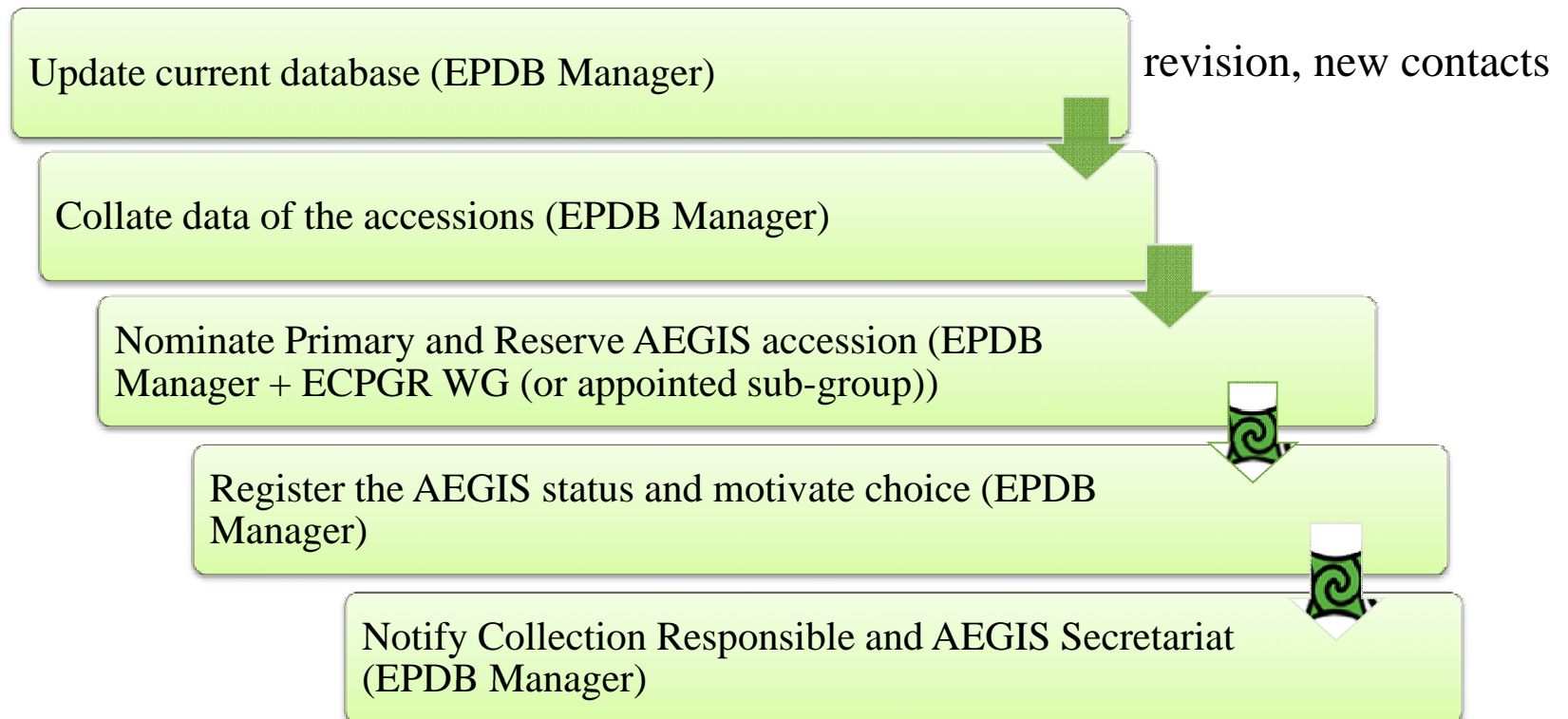
recommended

ACCENUMB  
ACQDATE  
DONORCODE & DONORDESCR  
DONORNUMB  
OTHERNUMB  
BREDCODE & BREDDDESCR  
IDENTIF (*Prunus* specific descriptor)  
VIRUSTATUS & VIRUSDATE (*Prunus* specific descriptors)





## 2. Draft List of MAA



This procedure is applicable after MoU signature

The list of Primary & Reserve accessions is dynamic, according to inclusion of new collections to AEGIS



## 2. Establishing the list of MAAs, using the EPDB as a tool

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**

**Primary selection  
criteria**

**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]



2A. List of MAAs generated for *Prunus* based on the EPDB:  
Choice of genotypes, analysing duplicates

**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**

**947 other accessions**

**1,116 unique genotypes**

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

**How many unique  
genotypes?**



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**

**947 other accessions**

**1,116 unique genotypes**

**367 duplicate groups**

**Fruit Synonyms meeting**  
**(Gembloux, 2008)**

**302 in > 1 country**  
**65 in 1 country**

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



2A. List of MAAs generated for *Prunus* based on the EPDB:  
Choice of MAAs, using secondary selection criteria

### Secondary selection criteria

- 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/homononyms are frequent)

### EPDB descriptors effectively used

- ORIGCTY**
- INSTCODE & INSTDESCR**
- DONORCODE & DONORDESCR**
- BREDCODE & BREDESCR**
- Other passport descriptors (few data) ☹**
- VIRUSTATUS (no data) ☹**
- VIRUSDATE (no data) ☹**
- Morphological descriptors (few data) ☹**
- Molecular descriptors (no data) ☹**
- Agronomical descriptors (few data) ☹**
- ACCENAME**
- PREFNAME: preferred name (new)**



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**

**947 other accessions**

**1,116 unique genotypes**

**367 genotypes**

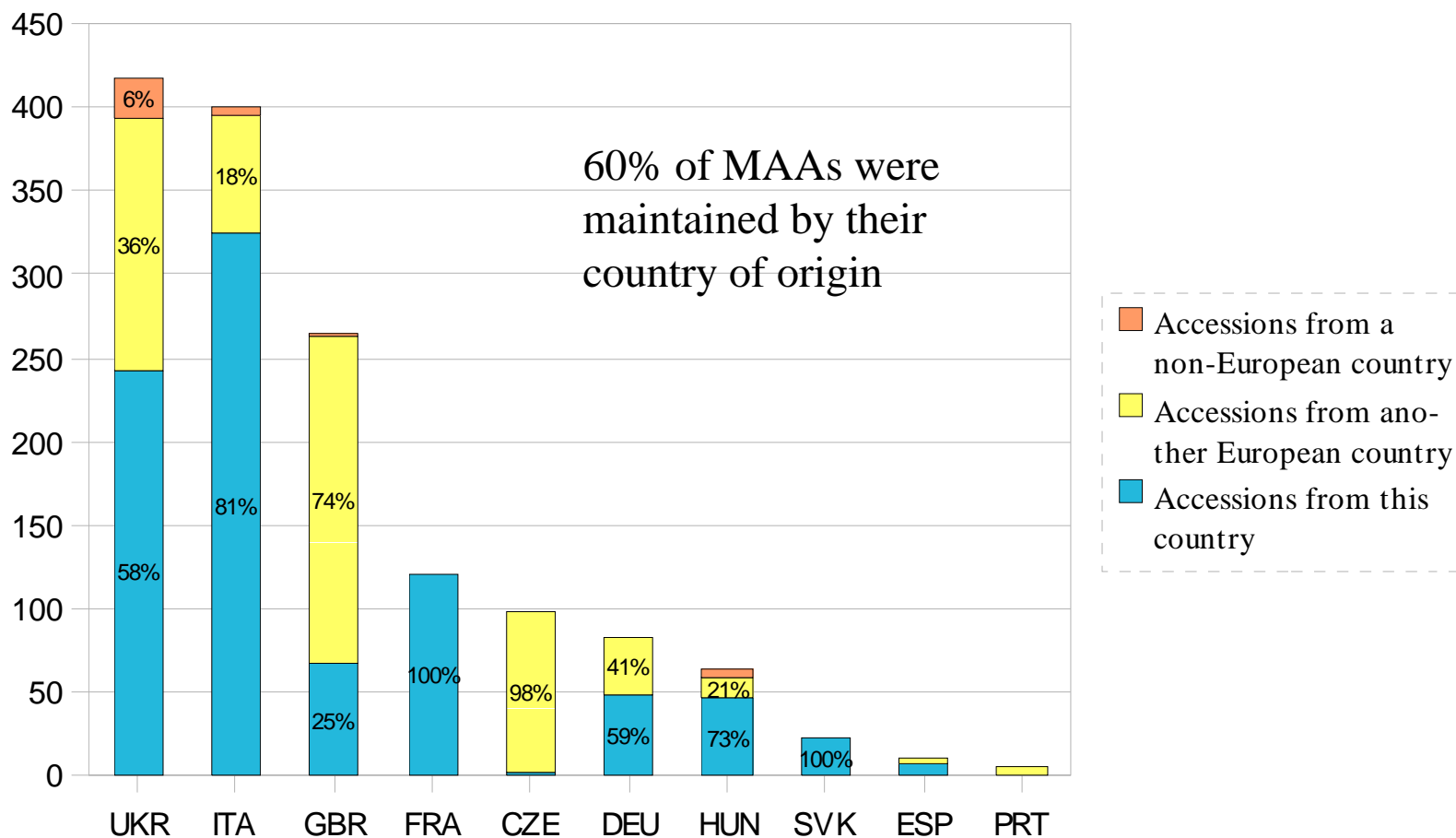
**Fruit Synonyms meeting**  
**(Gembloux, 2008)**

**302 in > 1 country**  
**65 in 1 country**

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



2A. List of MAAs generated for *Prunus* based on the EPDB:  
Analysing the draft list of sweet cherry MAAs



**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

☹ No countries had yet offered accessions to AEGIS

➔ All the countries should sign the MoU

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

☹ 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

☹ 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

### 3. AQUAS (AEGIS Quality System) - draft crop guidelines

*Prunus* (cherry) minimum technical standards proposed by AEGIS *Prunus* group (to be endorsed by *Prunus* WG)

#### 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

### 3. AQUAS (AEGIS Quality System) - draft crop guidelines

*Prunus* (cherry) minimum technical standards proposed by AEGIS *Prunus* group (to be endorsed by *Prunus* WG)

#### Maintenance of AEGIS accessions

- 
- A decorative vertical bar on the left side of the list, featuring a repeating pattern of green and black stylized floral or geometric motifs.
- 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

### 3. AQUAS (AEGIS Quality System) - draft crop guidelines

*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

### 3. AQUAS (AEGIS Quality System) - draft crop guidelines

*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)

### 3. AQUAS (AEGIS Quality System) - draft crop guidelines

*Prunus* (cherry) minimum technical standards proposed by AEGIS *Prunus* group (to be endorsed by *Prunus* WG)

#### 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



#### 4. Proposed workplan for implementation of AEGIS for *Prunus*

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

More....

Meetings, publications, newsletters, seeking funding

Encourage National genebanks involvement & promote AEGIS to potential users (NC)





## 5. Estimate costs for implementation of AEGIS (cherry)

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

**ESTIMATED TOTAL AMOUNT approx. 250, 000 €**



**Maegis**

European  
Cooperative  
Programme  
for Plant  
Genetic  
Resources  
**ECP/GR**

**Warsaw, Castle's square**

Photo: Audrey Didier

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