Malus / Pyrus Romanian germplasm fund and its use in the breeding program

PITESTI - ROMANIA
1877 - “Pomological sketches” by Mate Bereczki, 1,075 cvs. existing in his farm near Cenad (Western side of the country)

1924 — Albert Wachsman, over 1,000 apple and pear cvs., Prundul Bargaului (North-Western side of the country)

1951 — First Malus collection at RSFG Voinesti, Dambovita

1970 - 1971 — First Pyrus collection at RSFG Cluj Napoca and RIFG Pitesti

1974 — First reorganization of Malus collection at RSFG Voinesti, Dambovita (classic system – intensive system)

1990 — Second reorganization of Malus collection at RSFG Voinesti, Dambovita (grafted on M26 and grouping accesions by blooming period, disease resistance, ripening season)

2008 — Transfer of Malus collection at RIFG Pitesti, Arges

2011-presently — Reorganization of Pyrus collection at RIFG Pitesti, Arges
Distribution of species in Romanian fruit collections

- Apricot: 12%
- Cherry: 11%
- Small fruit: 9%
- Pear: 9%
- Plum: 14%
- Apple: 15%
- Peach: 19%
- Other 16 species: 11%

Malus/Pyrus Working Group, Weggis, March, 2012
**Malus genetic resources preserved at RIFG Pitesti, RSFG Voinesti and RSFG Bistrita**

<table>
<thead>
<tr>
<th>Institutes</th>
<th>Total no. of accessions</th>
<th>Species</th>
<th>Autochthonous accessions</th>
<th>Foreign cultivars</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIFG Pitesti</td>
<td>567</td>
<td>10</td>
<td>103</td>
<td>454</td>
</tr>
<tr>
<td>RSFG Voinesti</td>
<td>721</td>
<td>13</td>
<td>262</td>
<td>446</td>
</tr>
<tr>
<td>RSFG Bistrita</td>
<td>233</td>
<td>3</td>
<td>54</td>
<td>176</td>
</tr>
</tbody>
</table>

- Surface: 4, 00 ha
- 2-3 trees / genotypes, grafted on M 26 (RSFG Voinesti) and MM106 (RIFG Pitesti and RSFG Bistrita)
Pyrus genetic resources preserved at RIFG Pitesti and RSFG Cluj

<table>
<thead>
<tr>
<th>Institutes</th>
<th>Total no. of accessions</th>
<th>Species</th>
<th>Autochtonous accessions</th>
<th>Foreign cultivars</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIFG Pitesti</td>
<td>252</td>
<td>10</td>
<td>51</td>
<td>191</td>
</tr>
<tr>
<td>RSFG Cluj</td>
<td>241</td>
<td>22</td>
<td>64</td>
<td>155</td>
</tr>
</tbody>
</table>

- Surface: 2, 00 Ha
- 2-3 trees / genotypes, grafted on seedling rootstocks
Pomological traits of the tree and fruit (based on UPOV and IPGRI descriptors)

- Resistance / tolerance to scab, mildew and fire blight (phenotypical evaluation in the field by natural infection)

<table>
<thead>
<tr>
<th>Apple descriptors</th>
<th>Pear descriptors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit use</td>
<td>Fruit use</td>
</tr>
<tr>
<td>Season of flowering</td>
<td>Season of flowering</td>
</tr>
<tr>
<td>Colour of flower button</td>
<td>Colour of flower button</td>
</tr>
<tr>
<td>Harvest maturity</td>
<td>Harvest maturity</td>
</tr>
<tr>
<td>Fruit size</td>
<td>Fruit size</td>
</tr>
<tr>
<td>Fruit shape</td>
<td>Fruit shape</td>
</tr>
<tr>
<td>Over colour</td>
<td>Over colour</td>
</tr>
<tr>
<td>Ground colour</td>
<td>Ground colour</td>
</tr>
<tr>
<td>Susceptibility to <em>Venturia inaequalis</em></td>
<td>Resistance to <em>Erwinia amylovora</em></td>
</tr>
<tr>
<td></td>
<td>Resistance to <em>Psylla</em> sp.</td>
</tr>
</tbody>
</table>
APPLE BREEDING PROGRAM

- **I stage (1950-1980):** RSFG Voinesti, RSFG Cluj, RSFG Falticeni, RSFG Tg. Jiu, RSFG Bistrita, RIFG Pitesti

**Objectives:**

- Improving the fruit quality of the local varieties (Cretesc, Domnesc, Patul, Calugaresc, Verzisoare)
- Resistance to scab

**GENITORS:**

- Jonathan, Golden Delicious, Red Delicious, Kalter Bohner, Gravestein, Cox Orange, Wagener, London Pepping, Parmain d’or, Winter Banana
- *Malus kaido, Malus zumi*
• **II stage (1980-2000):** RIFG Pitesti, RSFG Voinesti, RSFG Cluj, RSFG Falticeni

**Objectives**

- Resistance to scab
- Fruit quality (appearance, size)
- Good storage
- Compact habit

**GENITORS:**

- Prima, Florina, Liberty, Priam, Sir Prize, Mc Free, Nova Easigro
- Golden Delicious, Goldspur, Idared, Starkrimson, Fuji
- Granny Smith, Generos
- Mc Intosh Wijcik

*Malus/Pyrus Working Group, Weggis, March, 2012*
III stage (2000 - presently): RIFG Pitesti, RSFG Voinesti

Objectives

- Disease resistance (scab, powdery mildew)
- Fruit quality (taste, firmness and juicyness)
- Good storage and shelf-life

GENITORS:

- Enterprise, Ariwa, Ariane, Crimson Crisp
- Luna, Opal, Pinova, Falstaff, Saturn, Honey Crunch
- Dalinette, Goldrush, Generos
THE MOST USED GENITORS IN THE APPLE BREEDING AND RELEASED CULTIVARS

Malus/Pyrus Working Group, March, 2012
ROMUS 4
(Romus 3 x Prima)
Summer, scab tolerant cv.

ROMUS 5
(Romus 3 x Prima)
Autumn, scab tolerant cv.

Malus/Pyrus Working Group, Weggis, March, 2012
RUSTIC
Florina x Pionier
Winter, scab tolerant cv.

REBRA
Florina x Idared
Winter, scab tolerant cv.

Malus/Pyrus Working Group, Weggis, March, 2012
Columnar, scab tolerant apple cvs.

COLMAR
(Mc Intosh Wijcik x Florina)

NICOL
(Mc Intosh Wijcik x Pionier)

Malus/Pyrus Working Group, Weggis, March, 2012
PEAR BREEDING PROGRAM

• I stage (1951-1990): RSFG Voinesti, RSFG Cluj, RSFG Bistrita, RSFG Geoagiu, RIFG Pitesti

Objectives

- Fruit quality (taste balanced, buttery texture)
- Earliness

GENITORS:

- Beurre Hardy, Santa Maria, Josephine de Malines, Williams
- Beurre precoce Morettini, Clapp’s Favourite
**II stage (1990-presently):** RIFG Pitesti, RSFG Voinesti, RSFG Cluj

**Objectives**

- Resistance / tolerance to fire blight
- Tolerance to *Psylla* sp.
- Good storage + shelf life
- Red colored flesh

**GENITORS:**

- *Pyrus serotina*, Kieffer seedling
- Tse Li, Chang Pa Li, Severianka, Imperiale
- Cure, Doyenne d’hiver, Contesse de Paris, Euras, Virgiliu hibernal
- Cu miezul rosu
THE MOST USED GENITORS IN THE PEAR BREEDING AND RELEASED CULTIVARS

Other 43%

Olivier de Serres 9%
Doyenne d'hiver 10%
Comtesse de Paris 11%
Beurre precoce Morettini 12%
Napoca 15%
Trivale, Triumf, Argessis, Daciana, Carpica, Getica, Jubileu 50, Ina Estival
Virgiliu hibernal Milenium
Tudor Euras
Untoasă de Geoagiu Euras
Euras
Aromata de Bistrita
Napoca
Aniversare
Republica
Doina
Corina
Orizont
Ervina

Malus/Pyrus Working Group, Weggis, March, 2012
MONICA
(Santa Maria x Principe di Gonzaga)
Autumn, fire blight tolerant cv.

ARGESSIS
(Napoca x B.p. Morettini)
Summer, good fruit quality.

Malus/Pyrus Working Group, Weggis, March, 2012
Fire blight tolerant pear cvs.

ERVINA

PARAMIS
(Monica x Passe Crassane)
Thanks for your attention!