PLUM GERMPLASM RESOURCES AND BREEDING IN ROMANIA

Butac Madalina, Botu Mihai, Militaru Madalina, Mazilu Craisor, Dutu Ion, Nicolae Silvia
PLUM CULTURE IN EUROPE AND ROMANIA (FAO data, 2018)

<table>
<thead>
<tr>
<th>Country</th>
<th>Surface (ha)</th>
<th>Crop (to)</th>
<th>(to/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europa</td>
<td>391,469</td>
<td>2,636,221</td>
<td>6.7</td>
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<tr>
<td>Serbia</td>
<td>77,949</td>
<td>463,115</td>
<td>5.9</td>
</tr>
<tr>
<td>Romania</td>
<td>65,114</td>
<td>512,975</td>
<td>7.9</td>
</tr>
</tbody>
</table>

- Surface area as a percentage of total agricultural land:
  - Europa: 10.8%
  - Serbia: 17.5%
Romania is a country located in South East Europe which has good environmental conditions for many fruit species in the wild or cultivated status. Numerous genetic resources of plum, apple, pear, sweet and sour cherry, peach, apricot, walnut, hazelnut, sweet chestnut, berries are present (Botu et. al., 2017).

In Romania, after 1970, identification, conservation and evaluation of fruit genetic resources activities were started in order to limit the loss of the biodiversity due to erosion and genetic vulnerability.

The genetic resources preserved by ex situ and in situ methods are very important value and can be use for breeding new cultivars and rootstocks.

The success of any breeding program depends on the existence of a rich and valuable germplasm fund.
I. INTRODUCTION

- Presently, in Romania there are plum collections in two centers: RIFG Pitesti and UCv-SCDP Vâlcea.
<table>
<thead>
<tr>
<th>No.</th>
<th>Center</th>
<th>Type of collections</th>
<th>Species and intersp. hybrids</th>
<th>Local accessions</th>
<th>Foreign accessions</th>
<th>Other (biotypes, hybrids, mutants)</th>
<th>Total no. of accessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RIFG Pitesti</td>
<td>Cultivars</td>
<td>7</td>
<td>183</td>
<td>320</td>
<td>40</td>
<td>550</td>
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<td></td>
<td></td>
<td>Rootstocks</td>
<td>0</td>
<td>82</td>
<td>10</td>
<td>0</td>
<td>92</td>
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<td></td>
<td>TOTAL RIFG</td>
<td></td>
<td>7</td>
<td>265</td>
<td>330</td>
<td>40</td>
<td>642</td>
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<td>2</td>
<td>UCv-SCDP Vâlcea</td>
<td>Cultivars</td>
<td>27</td>
<td>56</td>
<td>125</td>
<td>35</td>
<td>216</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rootstocks</td>
<td>86</td>
<td>21</td>
<td>11</td>
<td>11</td>
<td>118</td>
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<tr>
<td></td>
<td>TOTAL ECv-SCDP</td>
<td></td>
<td>27</td>
<td>142</td>
<td>146</td>
<td>46</td>
<td>361</td>
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<tr>
<td></td>
<td>TOTAL GENERAL</td>
<td></td>
<td>34</td>
<td>407</td>
<td>476</td>
<td>86</td>
<td>1,003</td>
</tr>
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</table>
• In these collections of cultivars and rootstocks, have been made observations and determinations regarding:
  - phenology,
  - productivity,
  - vigor,
  - fruit quality,
  - resistance/tolerance to diseases and pests,
  - resistance to low temperatures,
  - resistance to frost.

• The observations and measurements were done according to the IBPGR *Prunus* descriptors updated by the ECP/GR *Prunus* Working Group members within the Genres CT95 No 61 project in titled "International network on *Prunus* genetic resources".

in order to select genitors for breeding works.
THE MAIN OBJECTIVES IN PLUM BREEDING IN ROMANIA

CULTIVARS

1960 – 1980
- Improvement of old cvs. Tuleu Gras Vinete Romanesti Grase Romanesti
- Selection inside of wild population

1980 – 2000
- Fruit quality for fresh market
- Ripening season extension
- Tolerance to PPV

2000 – present
- Tolerance to PPV
- Fruit quality
- Yielding capacity
- Self fertility

ROOTSTOCKS

- Low to medium induced vigour
- Tolerance to PPV and foliar diseases
- Easy propagation
- Adaptability to heavy soil
- Good anchorage in the soil
GENITORS USED IN PLUM cvs. BREEDING

BASIC GENITORS
- Tuleu gras
- Centenar
- Carpatin
- Tuleu timpuriu
- Tita
- Alina
- Record
- Minerva
- Pitesteian
- Valcean
- Stanely
- Renclod Althan
- Anna Spath

CHARACTER GENITORS
- Oneida Kirke
- Grase de Becs Jojo
- Grande Prize
- Oneida Vision
- Romanta
- Valcean
- Stanley
- Anna Spath
- Standard
- Cacanska lepotica
- Romanta
- Stanley
- Anna Spath
- Cacanska lepotica
- Ialomita
- Early Rivers
- Ruth Gerstetter
- Ialomita
- Diana

TOLERANCE TO PPV

FRUIT QUALITY

YIELDING CAPACITY

SELF FERTILITY

EARLINESS
GENITORS USED IN PLUM ROORSTOCK BREEDING

**Prunus domestica**
- Rosior varatec
- Rencold verde
- Brompton
- Otanesi 8
- Voinesti B

**Prunus cerasifera**
- Corcodus 163
- Corcodus 169
- BN4Kr
- Myrobalan selections

**Prunus insititia**
- Pixy
- Otanesi 11
- Saint Julien A
- Scoldus
- Albe mici

**Prunus spinosa**

**Prunus besseyi**
- Brooks
- P. besseyi selections

**Prunus tomentosa**
- Orient
BREEDING METHOD AND RESULTS FOR CVS.

- Controlled hybridization
- Open pollination
- Selection
- Mutagenesis

1,750 hybrid combinations
2,000,000 pollinated flowers
300,000 hybrid stones
125,000 hybrids seedlings
350 promising selections
40 CULTIVARS

RIFG PITESTI
23 CULTIVARS

RSFG BISTRITA
11 CULTIVARS

RSFG VÂLCEA
6 CULTIVARS
Selections from wild and cultivated native flora (nursery seed beds included)

Inter and intraspecific crosses

**BREEDING METHOD AND RESULTS FOR ROOTSTOCKS**

**RIFG PITESTI**
4 rootstocks:
- 2 generative
- 2 vegetative

**RSFG BISTRITA**
1 generative rootstocks

**RSFG VALCEA**
7 rootstocks:
- 1 generative
- 6 vegetative
EVOLUTION OF PLUM ASSORTMENT

**Grase romanesti**
- Gras ameliorat

**Vinete romanesti**
- Vinete romanesti 300

**Tuleu gras**
- Tuleu timpuriu
- Superb
- Tuleu dulce
- Albatros
- Centenar
- Pitesteian
- Dambovita
- Carpatin
- Minerva
- Flora
- Sarmatic
- Baragan 17
- Tita
- Alina
- Iulia
- Ivan
- Jubileu 50
- Roman
- Romaner
- Dani
- Geta
- Elena
- Topval

**Other**
- Silvia
- Pescarus
- Ialomita
- Diana
- Record
- Valcean
- Renclod de Caransebes
- Agent
- Andreea
- Delia
- Doina
- Matilda
- Zamfira
- Alutus
- Romanța

1960 - 1980

1960 - prezent
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<th>Nr. crt.</th>
<th>Soiul</th>
<th>July</th>
<th>August</th>
<th>September</th>
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<tr>
<td>1</td>
<td>Early Rivers</td>
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<td>Ialomăţa</td>
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<td>Vâlcean</td>
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<td>Piteştian</td>
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<tr>
<td>6</td>
<td>Tita</td>
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<td>Carpaţin</td>
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<tr>
<td>17</td>
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<td>19</td>
<td>Andreea</td>
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<td>Tuleu gras</td>
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<tr>
<td>22</td>
<td>Stanley</td>
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<tr>
<td>26</td>
<td>Jubileu 50</td>
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<td>36</td>
<td>Anna Spath</td>
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</tbody>
</table>
**PITESTEAN**  
*(Tuleu timpuriu x Early Rivers)*  
Earliness  
Large fruit (50 g)  
Good yielding capacity

**CENTENAR**  
*(Tuleu gras x Early Rivers)*  
Earliness  
Good yielding capacity  
Excellent taste
**CARPATIN**  
(Tuleu gras x Early Rivers)  
Earliness.  
Good yielding capacity  
Large fruit (50 g)  
Tolerance to PPV.

**TITA**  
(Tuleu gras – irradiated stones)  
Earliness.  
Good yielding capacity  
Good quality fruit
ALBATROS
(Tuleu gras – Open pollination)
Excellent taste

PESCARUS
(R.C. Althan x Wilhelmina Spath)
High productivity.
AGENT
(Selection in wild population)
High content in sugar (over 25% soluble solids content)
Tolerance to PPV.

ROMAN
(Tuleu gras x Early Rivers)
Large fruit (> 45 g)
Tolerance to PPV.
ROMANȚA
Stanley x Vâlcean
High productivity
Large fruit (60 g)
Tolerance to PPV
Selffertility
ADAPTABIL

Named in 2000 year;

Origin: *Prunus besseyi* x mixed pollen from *Prunus* sp.; probably a *P. besseyi* x *P. persica* hybrid;

Vegetative rootstock for peach and nectarine cultivars and also for plum;

Tolerant to foliar diseases and to Plum-pox virus;

Very easy to propagate by softwood cuttings (over 90% rooted cuttings);

Medium to low influence for vigor in orchard, and long life for the grafted trees (18-20 years).
MIRODAD 1
Mirobolan dwarf x Adaptabil
Vegetative rootstock for high density European PLUM orchards.
CORVAL
Selection in *P. cerasifera*
Population
Generative rootstock for high density orchards
THANK YOU FOR ATTENTION!