Third meeting of *Malus*/*Pyrus* working group of the ECP/GR

**Status of *Malus* and *Pyrus* Collections in Georgia**

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Institute of Horticulture, Viticulture and Oenology (IHVO).
Tbilisi. Georgia.

Location: South Caucasus
Longitude: 40º05´ - 46º44´
Latitude: 41º07´ - 43º35´N
Area: 69.700 km²

Annual average temperature: +11° - +12°
Sum of active temperature: 3200º - 4000º and more
Minimal temperature: -15º one time in 20-25 years

Annual precipitation: 1000 - 2800 mm in Western Georgia,
300 - 800 mm in Eastern Georgia.

Climatic zones: Western Georgia - dominants humid subtropical climate,
Eastern Georgia - are ranging from subtropical to moderate
History of *Malus/Pyrus* Collections in Geo

- Introduction of European cultivars in Georgia started since 1845-1850.

- In the 60th of XIX century Niko Ketskhoveli from village Tkviavi had more than 200 cultivars of apple, pear and other fruits in his collection; Isaia Purtseladze from village Mereti had approximately 500 European cultivars and autochthonous varieties of different fruits.

- Sokhumi Testing Station, established in 1894, maintained 147 introduced cultivars of apple and 262 cultivars of pear together with other crops.

- Sakara Testing Station of Horticulture, established in 1932, had large collection of fruit crops with 291 varieties of apple and 169 varieties of pear (introduced + local) among those. For 1969 here was other collections with 495 varieties of apple and 200 varieties of pear with different fruit crops.

- IHVO Varketili collection of various fruits was established in 1961-1964 with 133 varieties of apple and 50 varieties of pear together with other fruits.

- IHVO Galavani collection of fruit crops was largest in the 80th of XX centuries.
List of *Malus/Pyrus* Collections in Georgia for Today

1. IHVO Gori collection of apple and pear modern cultivars and rootstocks, established in the framework of the FAO project

2. IHVO Gori orchard of breeding apple forms

3. IHVO Vashlijvari collection of hybrid apple and pear

4. NGO “Elkana” collection of autochthonous varieties of apple in Akhaltsikhe

5. Gori Fruit Producers Association’s collection in Kareli district in village Bebnisi
The collection was established in the framework of the FAO project “Fruit Sector Rehabilitation Project in Georgia” in 2002.

Main mission of the collection is renew of cultivated varieties of apple and pear in Georgia.

The varieties are advanced European and American cultivars. They were introduced from the nursery of Batistini, Italy.

<table>
<thead>
<tr>
<th>Rootstocks:</th>
<th>Apple - Number of:</th>
<th>Pear - Number of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 acc. 755 plants</td>
<td>accessions -10</td>
<td>accessions – 10</td>
</tr>
<tr>
<td>2 acces. 10 plants</td>
<td>plants in acc. 3-7</td>
<td>plants in acc.1-7</td>
</tr>
<tr>
<td></td>
<td>total plants - 47</td>
<td>total plants - 35</td>
</tr>
</tbody>
</table>

Planting Layout: 5.0x2.0
Grafted
Rootstocks: M9 (apple) and seedlings (pear)
IHVO Gori Orchard of Breeding Forms of Apple

Year of Establishment – 2000
Planting Layout – 7.0 x 5.0 m
Status of plants – Hybrids Grafted

Gori Breeding Station of IHVO
Longitude 42°00’58
Latitude – 44°06’30
Altitude – 620 m asl.

Numbers:
• accessions – 20
• plants per acc. 2-10
• total plants - 126
IHVO Vashlijvari Collections-Apple & Pear

Location:
Tbilisi. Inner Kartli.
In front of the main building of the Institute
6 Marshal Gelovani Ave.

Longitude – 41°45′
Latitude – 44°47′
Altitude – 420 m asl.

Type of Soil – Alluvial

Average temperature in the year – 12,5 °C

Average rainfall in the year – 580 mm
IHVO Vashlijvari Collection – Apple

Number of:
• accessions – 16
• hybrids – 9
• Introduced cultivars – 7
• selected forms – 3
• plants - 34

Year of Establishment – 2002
Planting Layout – 2.5 x 1.8
Type of Plants - grafted
Rootstock - seedlings
IHVO Vashlijvari Collection – $F_1$ Hybrid Pears

Year of Establishment – 1995

Type of plants – Seedlings

Planting layout – 2.5x1.8m

Number of:
- accessions - 103
- plants - 103
- crossing – 20 combinations
- selected forms – 10

Breeders:
K. Dzeria
M. Baratashvili
Z. Bobokashvili
Diversity of Hybrid Pears

(Vashlijvari Collection)
The Apple Collection of the Fruit Association

- Year of Establishment – 2004
- Planting Layout – 5.0 x 3.0 m
- Status of plants – Modern Cultivars
- Grafted Rootstocks – M7, M9, MM106, M111
- Drop irrigation

Village Bebnisi (Kareli)
- Longitude 42°02’55"
- Latitude – 43°54’31"
- Altitude – 662 m asl.

Numbers:
- accessions – 21
- plants per acc. – 34
- total plants – 846
- 3 rootstocks – 5000
GEF/UNDP Project on Agrobiodiversity
GEO/01/G41/A/1G/72

Title: Recovery, Conservation and Sustainable use of Georgia’s Agrobiodiversity.

Receiver: Biological Farming Association “ELKANA” (NGO)

Realization: 3 agricultural regions of Georgia - Samtskhe-Javakheti, Racha-Lechkhumi and Svaneti - were investigated and biodiversity of autochthonous varieties of fruit crops have been described.

Expert Institution: Research Institute of Horticulture, Viticulture and Oenology

Supervisor from the Institute: Dr. Vazha Kvaliashvili

Fruit experts:
- Samtskhe - Javakheti – Drs G. Jomardidze, T. Kurtanidze
- Ratcha - Lechkhumi – Drs D. Maghradze, M. Donadze
- Svaneti – Drs K. Dzeria, T. Trapaidze

Year: 2001
Results of the “Elkana Project”

Ratcha-Lechkhumi:
- Apple: 17
- Pear: 18

Svaneti:
- Apple: 4
- Pear: 3

Samtskhe – Javakheti:
- Apple: 32
- Pear: 27

Total results:
- Apple: 53
- Pear: 48
**“Elkana” Collection of Local Apple Varieties in Akhaltsikhe**

**Location:**
Village – Tsnisi
Longitude – 41°39.33N
Latitude – 43°01.59E
Altitude - 970 asl.

**Number of:**
- accessions - 22
- plants in acc. – 10
- total plants – 220
- autochthonous var.
- parents - unknown

**Year of planting - 2005**

**Planting Layout:** 5.0x4.0 m
Research of Local Fruit Diversity by IHVO

In August 2005 the Department of Grapevine and Fruit Crop Germplasm Research, Genetics and Breeding and Skra Testing Station of Horticulture of the IHVO organized expedition for investigation local varieties of fruit in Gori district (Inner Kartli).

113 genotypes have been discovered. Among those are 80 genotypes of apple and pear.

Founded local varieties have been propagated in a nursery.

New orchard will be established in Spring 2007.
### Status of Collections in Georgia

**Table 1. Status of apple and pear collections in Georgia for 2006**

<table>
<thead>
<tr>
<th>Accession type</th>
<th>No of accessions</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Apple</td>
<td>Pear</td>
<td></td>
</tr>
<tr>
<td>Advanced cultivars</td>
<td>38</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Local Varieties</td>
<td>22</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Hybrid - selected</td>
<td>29</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Hybrid – F&lt;sub&gt;1&lt;/sub&gt; seedlings</td>
<td>0</td>
<td>103</td>
<td></td>
</tr>
<tr>
<td>Wild species</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Rootstocks</td>
<td>7</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>96</td>
<td>115</td>
<td></td>
</tr>
</tbody>
</table>
Crop Wild Relatives

26 Species of *Pyrus* in the Caucasus
11 Species – in Georgia

2. *P. Balansae* Decne.
5. *P. Eldarica* Gross. *
8. *P. Takhtadzhiani* Fed. *
10. *P. Georgica* Kuth. *
11. *P. Salicifolia* Pall.

3 Species of *Malus* in the Caucasus
1 Species – in Georgia

1. *M. Orientalis* Uglitzk.

Fig. Spreading of *Malus* Species in the Caucasus (Grossgeim, 1957)
“Fruits of Georgia”

In 1939 and 1941 trilingual (Geo, Russ, Eng) “Fruits of Georgia” was published by N. Khomizurashvili & E. Eristavi. Editor in Chief – N. Ketskhoveli.

Volume 1.
“Varieties of Local Georgian Fruits”
Apple – 29   Pear - 14

Volume 2.
“Varieties of Commercial Georgian Fruits”
Apple – 30   Pear – 27
“Fruits of Georgia”- An Example

Varieties are described with color pictures and with main botanical and pomological characteristics, including information about origin and spreading in Georgia.

Varieties of **Pome fruits** are described in the **III volume** with color pictures and main descriptions of pomological, biological, agronomical, chemo-technological characteristics.

Described Varieties:
- **Apple** – 115 (58 loc)
- **Pear** – 65 (40 local)
- **Quince** – 33 (25 loc)
The Catalogue “Georgian Fruits”

The bilingual (Geo, Eng) “Georgian Fruits” (Catalogue of the dominant and prospective pome and stone fruits) have been prepared in the framework of the FAO “Fruit Sector Rehabilitation Project” TCP/GEO/0065 (A) and was printed in 2001. Editor – V. Kvaliashvili.

Described Cultivars:
Apple – 14 (4 local)
Pear – 9 (2 local)
Quince – 3 (local)
These are new hybrid cultivars of IHVO breeding described with usage **47 descriptors** by Drs Z. Bobokashvili and M. Baratashvili.

Most of varieties need to be described.

No one Georgian varieties have been described by molecular markers since today.

In Georgia don’t is any laboratory of DNA analyses for investigation agricultural biodiversity.

But in the framework of the World Bank “ARET” project our institute has ordered basic equipments for organization molecular laboratory.
# Geo Malus/Pyrus Excel Database

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td>Variety</td>
<td>Species</td>
<td>Pedigree</td>
<td>Supplier</td>
<td>Number</td>
<td>Rootstock</td>
<td>Average weight of fruit</td>
<td>Color of fruit</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>Malus Mill</td>
<td>Malus Mill</td>
<td>Introduction</td>
<td>Battilini nursery, ITALY</td>
<td>6</td>
<td>809 Pajonal</td>
<td>150 - 170</td>
<td>RED</td>
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<td>Abate Gallo</td>
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<td>6</td>
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<td>150 - 170</td>
<td>RED</td>
</tr>
</tbody>
</table>
22 apple and 30 pear accessions from our institute present in this database.
Conclusions

• Little number of advanced cultivars are in the collections of our country

• Very few autochthonous and local varieties are protected in our collections in spite their wide number in farms and gardens in Georgia

• Wild species of *Malus* and *Pyrus* absent in our collections

• Absent of governmental funding projects for protection biodiversity of fruit crops

• Not all Georgian local varieties are described by pomological and agronomic traits yet

• Most local varieties need to be described with usage IPGRI and UPOV descriptors

• Do not exist the book with color photos and description of all local varieties

• Accessions of fruit crops from Georgia aren’t included in the European *Malus, Pyrus*, EURESCO and other databases even only in the “Hortivar”.
Acknowledgments

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