New dwarfing and semi-dwarfing rootstocks tested in France

Furtos
Weïroot 158
Ceravium® PHL-A
Gisela 6
Context of the study

- French growers use vase training system with vigourous rootstocks like Sainte-Lucie 64, or semi-dwarfing like Maxma® 14.

- Dwarfing rootstock could be interesting:
  - to decrease production cost
  - to reduce time before the first fruiting
  - to allow rain covering or insect-proof nets installation

- When dwarfing rootstock was needed, only Tabel® Edabriz could be used, but it doesn’t work in all conditions.

**New dwarfing and semi-dwarfing rootstocks were needed!**
Earlier study

Semi-dwarfing and dwarfing rootstocks have been tested since years in the French *Ctifl/research stations network*. Some of them seem to be interesting, and are already (or soon) available:

- **Furtos**: an hungarian sour variety tested as rootstock since 1991. It will not be available before 2016.
- **Weïroot 158**: a german rootstock tested since 1995.
- **Ceravium® PHL-A**: a czech rootstock tested since 1996.
- **Gisela 6**: a german rootstock tested since 1999.

*Ctifl / research stations network network coordinated by the Ctifl and including several research stations in which La Tapy.*
A new trial planted in 2007

**Objective**: compare these four rootstocks

- 4 studied rootstocks: Furtos, Weïroot 158, PHL-A, Gisela 6
- 2 control rootstocks: Maxma® 14, Tabel® Edabriz
- 2 varieties: Folfer, Poisdel

**Folfer**(cov)
French variety created by INRA Bordeaux, and edited by CEP innovation. Mid to heavy vigor.

**Poisdel**(cov)
French variety created by Pierre Argot, and edited by Delbard. Vigourous. Seem to need more years before fruiting than Folfer.

- Training system: vase

10th to 11th February 2015, Trebinje (Bosnia and Herzegovina)
COST cherry meeting WG2 « Rootstocks and training system »
A new trial planted in 2007

- **11 plots** planted in France,

Different soil and weather conditions

in which **3 observed by La Tapy:**

Serres, Mazan, Gordes

Different soil conditions:
- Serres: clay loam soil
- Mazan: silt loam soil
- Gordes: sandy loam soil

- Number of repetitions:
  - Serres: 4 trees per association variety/rootstock
  - Mazan: 10 trees per association variety/rootstock
  - Gordes: 10 trees per association variety/rootstock
What are the results in the 3 plots observed by La Tapy (Serres, Mazan, Gordes)?

- Death rate
- Graft union
- Foliage
- Root suckers
- Vigor
- Time before fruiting
- Production
- Fruit size

Do the other plots confirm the results?

Which other informations are given by the other plots?
## Death rate

### Number of dead trees since the plantation

<table>
<thead>
<tr>
<th></th>
<th>SERRES (4 trees)</th>
<th>MAZAN (10 trees)</th>
<th>GORDES (10 trees)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Folfer</td>
<td>Poisdel</td>
<td>Folfer</td>
</tr>
<tr>
<td>Maxma® 14</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Furtos</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ceravium PHL-A</td>
<td>0</td>
<td>1 / 4</td>
<td>1 / 10</td>
</tr>
<tr>
<td>Weïroot 158</td>
<td>0</td>
<td>1 / 4</td>
<td>1 / 10</td>
</tr>
<tr>
<td>Gisela 6</td>
<td>0</td>
<td>0</td>
<td>1 / 10</td>
</tr>
<tr>
<td>Tabel® Edabriz</td>
<td>0</td>
<td>2 / 4</td>
<td></td>
</tr>
</tbody>
</table>

8 dead trees / 10
6 dead trees / 10
### Other sensitivities

- Gisela 6 seems to induce a higher sensitivity to double fruit.

<table>
<thead>
<tr>
<th>Percentage of double fruit on Folfer in Serres in 2013</th>
<th>% of double fruit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maxma® 14</td>
<td>3.5%</td>
</tr>
<tr>
<td><strong>Gisela 6</strong></td>
<td><strong>25.3%</strong></td>
</tr>
<tr>
<td>Furtos</td>
<td>0.3%</td>
</tr>
<tr>
<td>Weïroot 158</td>
<td>13.5%</td>
</tr>
<tr>
<td>PHL-A</td>
<td>0.5%</td>
</tr>
<tr>
<td>Tabel® Edabriz</td>
<td>15.8%</td>
</tr>
</tbody>
</table>

*Photos: Ctifl de Balandran*
Comments

On the plots observed by La Tapy:

- *Weïroot 158* seems to be sensitive to root asphyxia
- *Gisela 6* seems to induce a higher sensitivity to double fruit.

On the French network Ctifl / research stations:

- High mortality observed with *Weïroot 158* in Etoile-sur-Rhône (3 dead trees out of 4 for each variety).

Other observations:

- *Weïroot 158*: sensitive to mediterranean pine vole (Marsillargues)
Graft union

- **Gisela 6**: diameter of the variety often larger than diameter of the rootstock.
Foliage

On the French network Ctifl / research stations:

- **Furtos**: always a healthy vegetation, similar to Maxma® 14

  It's the same in the rest of the network: a healthy vegetation on all the plots and whatever the variety.

- **PHL-A**: medium to good foliage status

  Most of the time, PHL-A has a pretty good to good foliage status, except in Etoile-sur-Rhône (medium foliage status).

- **Weïroot 158**: medium to good foliage status

  Variable foliage status: medium to good foliage status.

- **Gisela 6**: medium (to poor) foliage status, with sometimes foliage missing, or leaves rolling up.

  Poor to medium foliage status, except in Montauban and St-Epain with Folfer, and Etoile and Obernai with Poisdel (good enough).
## Root suckers

**Average number of root suckers per tree (2012 to 2014)**

<table>
<thead>
<tr>
<th></th>
<th>SERRES (4 trees)</th>
<th>MAZAN (10 trees)</th>
<th>GORDES (10 trees)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Folfer</td>
<td>Poisdel</td>
<td>Folfer</td>
</tr>
<tr>
<td>Maxma® 14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Furtos</td>
<td>0.3</td>
<td>1.4</td>
<td>5.2</td>
</tr>
<tr>
<td>Ceravium PHL-A</td>
<td>4.7</td>
<td>5.2</td>
<td>7.2</td>
</tr>
<tr>
<td></td>
<td>(max 14)</td>
<td>(max 33)</td>
<td>(max 35)</td>
</tr>
<tr>
<td>Weïroot 158</td>
<td>6.8</td>
<td>10.8</td>
<td>10.2</td>
</tr>
<tr>
<td></td>
<td>(max 21)</td>
<td>(max 30)</td>
<td>(max 57)</td>
</tr>
<tr>
<td>Gisela 6</td>
<td>0.8</td>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Tabel® Edabriz</td>
<td>0.2</td>
<td>0.2</td>
<td></td>
</tr>
</tbody>
</table>
Comments

On the plots observed by La Tapy:

- **Weïroot 158 and PHL-A** are more sensitive to root suckers than Maxma® 14.

On the French network Ctifl / research stations:

- **Weïroot 158 and PHL-A** are also the rootstocks with the most important number of root suckers in the French network.
Vigor

Serres plot:

- Folfer
- Poisdel

- Furtos
- Gisela 3
- Gisela 6
- MM14
- PHLA
- Tabel
- W158

trunk section area (cm²)
Comments

On the plots observed by La Tapy:

- All studied rootstocks have a vigor between Tabel® Edabriz and Maxma® 14.
  - Furtos: 40 to 60% of the Maxma® 14
  - Gisela 6: 50 to 60% of the Maxma® 14
  - Ceravium® PHL-A: 40 to 60% of the Maxma® 14
  - Weïroot 158: 40 to 50% of the Maxma® 14

On the French network Ctifl / research stations:

- Furtos: 50 to 100% of the Maxma® 14
- Gisela 6: 50 to 80% of the Maxma® 14
- Ceravium® PHL-A: 60 to 90% of the Maxma® 14
- Weïroot 158: 40 to 70% of the Maxma® 14

Other observations:

Furtos is a dwarfing rootstock in poor soil, but his vigor is similar to Maxma® 14 in good soil conditions.
Productivity & Fruit weight

Serres plot:

<table>
<thead>
<tr>
<th></th>
<th>Folfer</th>
<th>Poisdel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8,4</td>
<td>9,3</td>
</tr>
<tr>
<td></td>
<td>7,6</td>
<td>10,0</td>
</tr>
<tr>
<td></td>
<td>8,9</td>
<td>8,7</td>
</tr>
<tr>
<td></td>
<td>9,0</td>
<td>8,5</td>
</tr>
<tr>
<td></td>
<td>7,5</td>
<td></td>
</tr>
</tbody>
</table>

Folfer:
- Productivity (kg/cm² of trunk section area)
- Folfer Poisdel

Poisdel:
- Fruit weight (g)
- Furtos Gis. 6 MM14 PHLA Tabel W158

Legend:
- Cumulative productivity
- Fruit weight
Comments

- In the 3 plots observed by La Tapy, Gisela 6 have an early first fruiting, a high productivity, and a small fruit.

On the French network Ctifl / research stations:

- Most of the time, Gisela 6 is the most productive one.
## Conclusion

<table>
<thead>
<tr>
<th></th>
<th>Furtos</th>
<th>Gisela 6</th>
<th>PHL-A</th>
<th>Weiroot 158</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vigor</strong></td>
<td>50 to 100% of Maxma®14</td>
<td>50 to 80% of Maxma®14</td>
<td>60 to 90% of Maxma®14</td>
<td>40 to 70% of Maxma®14</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td></td>
<td>sensitive to double fruit?</td>
<td></td>
<td>sensitive to root asphyxia? (Gordes)</td>
</tr>
<tr>
<td><strong>Foliage</strong></td>
<td>healthy vegetation, similar to M14</td>
<td>medium to poor foliage status</td>
<td>pretty good to good foliage status</td>
<td>medium to good foliage status</td>
</tr>
<tr>
<td><strong>Graft union</strong></td>
<td></td>
<td>diameter of the variety &gt; diameter of the rootstock</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Root suckers</strong></td>
<td>average sensitivity to root suckers</td>
<td>low sensitivity to root suckers</td>
<td>more sensitive than Maxma 14 to root suckers</td>
<td>more sensitive than Maxma 14 to root suckers</td>
</tr>
<tr>
<td><strong>First fruiting</strong></td>
<td></td>
<td>early first fruiting</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cumulative productivity</strong></td>
<td>pretty low productivity (like M14 or a little better)</td>
<td>high productivity (like Tabel® Edabriz)</td>
<td>pretty low productivity (like M14 or a little better)</td>
<td>pretty high productivity (better than M14)</td>
</tr>
<tr>
<td><strong>Fruit size</strong></td>
<td>from average to good size of the fruit</td>
<td>small fruit (need to be prune carrefully)</td>
<td>from average to good size of the fruit</td>
<td>from average to good size of the fruit</td>
</tr>
</tbody>
</table>

**Note:**
- 50 to 100% of Maxma®14
- 50 to 80% of Maxma®14
- 60 to 90% of Maxma®14
- 40 to 70% of Maxma®14
- sensitive to root asphyxia? (Gordes)
- sensitive to mediterranean pine vole (Marsillargues)
Thank you for your attention

Contact for more informations:

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