Performance of the sweet cherry cultivar ‘Lapins’ on 27 rootstocks growing in a Northern climate

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Norwegian sweet cherry production

- July and August is the main harvest seasons
- Short and relatively cool growing season
- Winter and spring frost rarely occurs
- International cultivars produce good quality fruit
- All sweet cherry orchards have rain covers

Three-wire rain cover system

Haygrove tunnels
Sweet cherry variety and rootstock testing in Norway

• Aim: Find productive and high quality varieties adopting to the Norwegian environment with different harvest windows from July to end of August

• Main characteristics: Good flavour, high annual yields, selvferile, large and firm fruits, cracking tolerance, good shelf life, dwarfing trees, high efficiency
Why use a rootstock

- Difficult to propagate the scion
- Give the tree important characteristics
Important characteristics

- Regulating tree growth
- Early and large yields
- Good anchorage in the soil
- Frost- and drought tolerance
- Little rootsuckers
- Compatibility between rootstock and scion
- Resistance/tolerance different pests
- Easy to propagate
Different growth vigour
Sweet cherry rootstocks – different characteristics

Compatibility
Good for P. avium seedlings
Variable for P. cerasus

Interstocks
Not common in use

Grafting height
Little effect on the growth vigour

Soil
Differences in drought tolerance and mineral uptake

Pests
Limited. Some tolerance to diseases, bacteria, viruses and nematodes
Sweet cherry – from large trees to high density, dwarfing trees
Cherry rootstocks - origins

- Prunus avium, - heavy growth
  Seedling
  Clone (F.12/1)
- Hybrids – red. growth
  Crosses between
  P. avium
  P. cerasus
  P. canescens
  P. fruticosa
European rootstock trial – Norway

Site: Bioforsk Ullensvang
Planting year: 1999
Planting distance: 2x4.5 m
<table>
<thead>
<tr>
<th>Tested rootstocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colt</td>
</tr>
<tr>
<td>Hex. Colt</td>
</tr>
<tr>
<td>Damil</td>
</tr>
<tr>
<td>Gisela 3</td>
</tr>
<tr>
<td>Gisela 4</td>
</tr>
<tr>
<td>Gisela 5</td>
</tr>
<tr>
<td>Gisela 6</td>
</tr>
<tr>
<td>Gisela 7</td>
</tr>
<tr>
<td>Gisela 11</td>
</tr>
</tbody>
</table>
## Botanical origin

<table>
<thead>
<tr>
<th>Rootstock</th>
<th>Botanical origin</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colt</td>
<td>P. avium x P. pseudocerasus</td>
<td>UK</td>
</tr>
<tr>
<td>Gisela, 5, 6, 7</td>
<td>P. cerasus x P. canescens</td>
<td>Germany</td>
</tr>
<tr>
<td>Gisela 4</td>
<td>P. avium x P. fruticosa</td>
<td>Germany</td>
</tr>
<tr>
<td>Gisela 11</td>
<td>P. canescens x P. cerasus</td>
<td>Germany</td>
</tr>
<tr>
<td>Weiroot 10, 58, 158</td>
<td>P. cerasus, klon</td>
<td>Germany</td>
</tr>
<tr>
<td>Piku 1</td>
<td>P. avium x (P. canescens x P. tomentosa)</td>
<td>Germany</td>
</tr>
<tr>
<td>Piku 3</td>
<td>P. pseudocerasus x (P. canescens x P. incisa)</td>
<td>Germany</td>
</tr>
<tr>
<td>M x M 14, 60, 97</td>
<td>P. avium x P. mahaleb</td>
<td>USA</td>
</tr>
<tr>
<td>PHL -A, B</td>
<td>P. avium, open pollinated (P. cerasus)</td>
<td>Czech</td>
</tr>
<tr>
<td>Damil</td>
<td>P. dawykensis, open pollinated</td>
<td>Belgium</td>
</tr>
<tr>
<td>Tabel Edabriz</td>
<td>P. cerasus, clone</td>
<td>France</td>
</tr>
</tbody>
</table>
Healthy trees by the end of the trial, %

[Bar chart showing the percentage of healthy trees for different rootstocks]
Trunk cross sectional area by the end of the eight growing season
Trunk cross sectional area - range

![Bar chart showing trunk cross sectional area for different rootstocks: Gisela 5, Gisela 6, Piku 1, Damil, Colt, Piku 3.](image-url)
Accumulated yield, kg pr. tree

Yield, kg

Rootstock
Yields per year, selected rootstocks

![Graph showing yields per year for different rootstocks.](image)

- **Colt**
- **Damil**
- **Gisela 5**
- **Gisela 6**
- **Piku 1**
- **Piku 3**
Total yields, selected rootstocks

- **Colt**
- **Damil**
- **Gisela 5**
- **Gisela 6**
- **Piku 1**
- **Piku 3**
Fruit weight, average data

The diagram shows the average fruit weight for different rootstocks. The x-axis represents the rootstocks, and the y-axis shows the fruit weight in grams. The rootstocks are listed from left to right as follows: MxM14, Tabel Edabritz, Gisela 3, PHL-A, MxM 97, Weirroot 53, Weirroot 158, Gisela 4, Hex.Colt, PHL-B, Gisela 7, Piku 3, GI 135/1, Gisela 5, GI 310/17, MxM 60, Weirroot 10, Gisela 6, Colt, GI 140/13, GI 497/8, Piku 1, Damill, GI 154/7, GI 107/1, GI 523/02, GI 195/20.
Fruit weight, g – selected rootstocks

<table>
<thead>
<tr>
<th>Grunnstamme</th>
<th>Fruktvekt, g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colt</td>
<td>9,9</td>
</tr>
<tr>
<td>Damil</td>
<td>10,1</td>
</tr>
<tr>
<td>Gisela 5</td>
<td>9,9</td>
</tr>
<tr>
<td>Gisela 6</td>
<td>10,0</td>
</tr>
<tr>
<td>Piku 1</td>
<td>10,1</td>
</tr>
<tr>
<td>Piku 3</td>
<td>9,5</td>
</tr>
</tbody>
</table>
Soluble solids, average data, percentage
Soluble solids, %

- Colt
- Damil
- Gisela 5
- Gisela 6
- Piku 1
- Piku 3

Grunnstamme

Oppløyst tørrstoff, %
Efficiency
Efficiency, yield/ TCA

Rootstock

Efficiency

- Piku 3
- Colt
- Damil
- Gisela 6
- Piku 1
- Gisela 5

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Leaf mineral content, percentage of dry weight

<table>
<thead>
<tr>
<th>Rootstock</th>
<th>Nitrogen</th>
<th>Phosfor</th>
<th>Potassium</th>
<th>Calsium</th>
<th>Magnesium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colt</td>
<td>2.25</td>
<td>0.26</td>
<td>1.49</td>
<td>1.53</td>
<td>0.33</td>
</tr>
<tr>
<td>Damil</td>
<td>2.50</td>
<td>0.23</td>
<td>1.53</td>
<td>1.21</td>
<td>0.26</td>
</tr>
<tr>
<td>Gisela 5</td>
<td>2.60</td>
<td>0.29</td>
<td>1.71</td>
<td>1.10</td>
<td>0.21</td>
</tr>
<tr>
<td>Gisela 6</td>
<td>2.46</td>
<td>0.26</td>
<td>1.41</td>
<td>0.97</td>
<td>0.20</td>
</tr>
<tr>
<td>Piku 1</td>
<td>2.60</td>
<td>0.32</td>
<td>2.08</td>
<td>1.24</td>
<td>0.24</td>
</tr>
<tr>
<td>Piku 3</td>
<td>2.51</td>
<td>0.31</td>
<td>2.07</td>
<td>1.36</td>
<td>0.25</td>
</tr>
<tr>
<td>Optimum range</td>
<td>2.5-3.0</td>
<td>0.15-0.25</td>
<td>1.5-2.0</td>
<td>1.0 – 1.5</td>
<td>0.2 – 0.3</td>
</tr>
</tbody>
</table>
Conclusion

1. The trees started to crop in the third leaf

2. Large variation in tree vigour.
   Piku 3, Colt og Damil – most vigorous
   Gisela 5 og 6, Piku 1- intermediate
   Tabel Edabriz, Weiroot 53 – dwarfing

3. Largest accumulated yield:
   Colt, Piku 1 and 3, Damil

4. Largest efficiency
   Gisela 4, Gisela 5

5. Fruit weights were in general large
   Colt, Damil, Piku 1 – largest fruits

6. The contents of soluble solids were high

7. Planting distance must be adjusted to the growth vigour of the rootstocks
Thank you for your attention