THE NORWEGIAN PEAR CULTIVAR CELINA

EUFRIN WG VARIETY TESTING APPLE & PEAR - MARCH 2016

MEKJELL MELAND,

Norwegian Institute of Bioeconomy Research
NIBIO Ullensvang
BACKGROUND

- Norwegian pear production has declined the last 25 years due to not a market for competitive cultivars.
- Graminor - a Norwegian breeding company - introduced many new cultivars from 1994.
- No more crossings are conducted, but still advanced candidates are under evaluation.
- NIBIO Ullensvang is responsible for official fruit cultivar testing program in Norway.
- Celina is the most interesting cultivar.
- It is a club cultivar and planted now in many countries.
NP 6246 - CELINA

Cross: Broket July (Coloree de Julliet) x Williams
Origin: Norway
Brand name: QTee®
Genotypes: Diploid
Breeder: Graminor AS, Norway. S. H. Hjeltnes
Variety rights: European Plant Variety Rights pending Graminor As since 2011
Entitled parties: ABCz Group and Fruithandel Wouters, both Belgium
FIRST FIELD TESTING STARTED IN 2002.  
PLANTING DISTANCE 2 X 4 M. ROOTSTOCK : BROKMAL

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Full bloom, dates</th>
<th>Harvest date</th>
<th>TCA$^{1)}$, cm$^2$</th>
<th>Accumulative yield, kg per tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clara Frijs</td>
<td>May 10</td>
<td>Sept. 23</td>
<td>34.9</td>
<td>13.5</td>
</tr>
<tr>
<td>Kristina</td>
<td>May 14</td>
<td>Sept. 24</td>
<td>36.1</td>
<td>38.5</td>
</tr>
<tr>
<td>Ingrid</td>
<td>May 7</td>
<td>Aug. 26</td>
<td>31.0</td>
<td>25.2</td>
</tr>
<tr>
<td>Celina</td>
<td>May 8</td>
<td>Sept. 20</td>
<td>37.4</td>
<td>21.2</td>
</tr>
<tr>
<td>Significance</td>
<td></td>
<td></td>
<td></td>
<td>***</td>
</tr>
</tbody>
</table>
CELINA

– Interesting cultivar in other countries with warmer climate
– Significant acreage is planted in Norway 2015/16
– New innovation project funded about Management
  – Genetic analysis.
  – Pollination and fruit set
  – High density plantings
  – Harvest windows, storage and fruit quality

Cooperators: University of Sarajevo, University of Belgrade and Graminor AS

Project owner: The fruit packing house ‘Sognefrukt’
GENOTYPING S-RNASE GENE OF EUROPEAN PEAR

The phenotypic accuracy of S genotyping using consensus and allele specific primers has been confirmed through test crosses in several studies!

So far 24 S alleles have been detected in European pear genotypes.

S allele data is available for over 150 traditional and commercial European pear cultivars.

Prior to S genotyping all examined pear genotypes from Norway were genotyped using SSR markers, along with nine reference cultivars, in order to confirm their genetic identity.
S-ALLELS CELINA, ONE FOUND SO FAR – S101

– Only one allele was found for cultivar ‘Celina’.

– Based on the cultivars pedigree (‘Willimas’ x ‘Broket Julie’) and the fact that S alleles are inherited according to Mendelian principles, only other possible alleles that this cultivar could posses are **S102** or **S115**.

– However neither of these two alleles has been discovered in our analyses.

– There could also be an unlikely possibility that ‘Celina’ is homozygous in S allele constitution due to an S allele breakdown in function.
BIOLOGY OF FERTILIZATION

– Frequency of flowering of different cultivars
– Cross pollination different pollinizers included open pollination and self pollination
– Pollen tube growth - pollen–pistil incompatibility reaction
– Pollen viability
– Embryogenesis- successful early embryo development
POLLEN TUBE GROWTH

. Pollen tube growth in the upper part of style. Good pollen load of stigma. ‘Celina’ x ‘Fritjof’, 3 days after pollination

Pollen tubes growth in the ovule. ‘Celina’ x ‘Conferance’, 6 days after pollination (longitudinally section).
## ROOTSTOCK TRIAL - CELINA
TRUNK CROSS- SECTIONAL AREA, CM²

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Quince Adams</td>
<td>2,1</td>
<td>2,7</td>
<td>6,0</td>
<td>8,8</td>
<td>11,4</td>
</tr>
<tr>
<td>Quince C</td>
<td>1,6</td>
<td>3,0</td>
<td>5,9</td>
<td>8,9</td>
<td>11,4</td>
</tr>
<tr>
<td>Quince Eline</td>
<td>1,5</td>
<td>2,3</td>
<td>4,9</td>
<td>8,4</td>
<td>11,0</td>
</tr>
</tbody>
</table>
TRAINING SYSTEMS

Spindle trees, 1x 4 m

Super spindle, 0.5 x 4 m

Photos: F.M. Maas
V- TREES, TWO LEADERS
TRAINING SYSTEMS, FOUR LEADERS
CONCLUSIONS

• Celina has an attractive red blush
• Howerever cumulative yields are rather low in Nordic environments
• Further investigations on dwarfing rootstocks is necessary and Orchard management must be improved to enable precocious, consistent high yields
• Research on genetics, biology of fertilization, rootstocks and training methods will continue
THANK YOU
FOR YOUR ATTENTION

NIBIO Ullensvang
Norway