COMPARISON OF CYDONIA AND PYRUS ROOTSTOCKS IN ESTONIA, LATVIA AND LITHUANIA

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The co-operative experiment “Baltic fruit rootstock” was established in three Baltic states – Estonia (at Polli), Latvia (at Pure) and Lithuania (at Babtai) in 2001. The cultivar ‘Suvenirs’ was grafted on three Cydonia rootstocks: BA29, QA and QC (the latter was missing in Estonia), and four Pyrus rootstocks: vegetative Pyrodwarf and OHF 333 and seedlings Kirchensaller Mostbirne, and Kazraus. In Lithuania (at Babtai) the trunks on every rootstock were thicker than in two other localities. The trees on the clones QC were found to be smaller and the trees on Pyrodwarf, OHF 333 and Kirchensaller Mostbirne were significantly more vigorous than these on the standard clone BA29. In Latvia (at Pure), the trees on all Pyrus rootstocks were more vigorous than these on Cydonia rootstocks. In Estonia (at Polli), the trees on Pyrodwarf and OHF 333 were found to be weaker than these on Cydonia rootstocks. The first crop in Lithuania appeared in the fourth year after planting only on Cydonia and Pyrodwarf rootstocks. In Estonia and Latvia, the first crop appeared in the fifth year on all rootstocks due to the entire killing of flowers in the fourth year by spring night frosts; the first crop was bigger on Cydonia rootstocks. In Lithuania, the fruit mass was bigger on OHF 333 than that on BA 29. Young pear trees of the cultivar ‘Suvenirs’ are less vigorous on Cydonia rootstocks. However, in some localities the trees on Pyrus rootstocks Pyrodwarf and OHF 333 may be even weaker then these on Cydonia rootstocks.

Key words: pear, rootstock, Baltic states.

Introduction. Commercial pear growing in Estonia, Latvia and Lithuania is not very perspective, due to severe winter damages. However, pear trees are growing in many home gardens on seedling rootstock Pyrus pyraster. The trees on vigorous rootstocks start to bear fruit late and take place.

It is possible to grow the trees on less vigorous rootstocks. Previous rootstock trials have included Cydonia A and C rootstocks, but in the colder winter-conditions
many trees perished. The most damaged were the trees on *Cydonia* QC rootstock even at West European climate conditions (Weber, 2001). In Latvia (Lepis et al., 2004) and Estonia even *Cydonia* QA rootstock was not winter hardy (Palk, 1987). In Lithuania QA, S1 and K11 showed promising results (Kviklys, 2005; Kviklys, Kviklienė, 2004), nevertheless *Pyrus* clonal rootstocks must be evaluated.

In 1998, the Baltic fruit rootstock study was initiated in three Baltic States (Bite et al., 1999) and first results reported (Bite et al., 2004).

The aim of the trial was to evaluate pear rootstocks performance in different geographical localities.

**Material and methods.** The planting material was propagated at the Pure Experimental station. The trees were planted at three sites in the spring of 2001: at the Lithuanian Institute of Horticulture – Babtai, at the Pure Experimental Station in Latvia, and at the Polli Research Centre of the Institute of Agricultural and Environmental Sciences of the Estonian University of Life Sciences. The geographical locations are: Babtai in Lithuania 55° 60’ N, 23° 48’ E, Pure in Latvia 57° 02’N, 22° 52’E, and Polli in Estonia 58° 67’N, 25° 33’E.

Pear cv. ‘Suvenirs’ was propagated on following rootstocks: *Cydonia* BA29, *Cydonia* QA, *Cydonia* QC, not planted in Estonia, *Pyrus* Pyrodwarf, *Pyrus* OHF333, *Pyrus* Kirchensaller Mostbirne seedlings, and *Pyrus* Kazrausu seedlings. An interstem Staras No. 31 was used for trees on *Cydonia* rootstocks to surpass the incompatibility between scion and rootstock. In Lithuania the soil humus content was 2.5%, P$_2$O$_5$ – 255 mg per kg, K$_2$O – 230 mg per kg, in Latvia the soil humus content was 1.8%, P$_2$O$_5$ – 189 mg per kg, K$_2$O – 151 mg per kg. In Estonia the experiment was located on a medium sod-podzolic soil. The tree spacing in Estonian experiment was 4.0 x 1.5 m, in Latvia and Lithuania there was a choice: for clonal rootstocks – 4 x 2 m and for seedling rootstock – 4 x 3 m. The space between the rows was held as grassland, and the row-stripe was managed by herbicides.

*Cydonia* BA29 was standard rootstock for comparison. There were 4 replications in every variant, 3 trees per plot. Trunk diameter of each tree was measured every autumn at the height of 30 cm and trunk cross-sectional area (TCSA) was calculated in 2005. Tree height and canopy diameter were measured only in Estonia. Fruits were harvested in 2004 (in Lithuania only) and in 2005 and yield (kg/tree) was recorded. The average fruit weight was calculated only in Lithuania. Statistical analyses of data were performed (p ≤ 0.05).

The weather conditions in Estonia and Lithuania didn’t differ substantially during the years 2001–2005. Only the amount of precipitations was different: at Polli (Estonia) the summer of 2002 was dryer.

**Results and discussion.** TCSA in Lithuania (all variants) was substantially bigger than in Estonia and Latvia (Table), due to more fertile soil. In Lithuania the trees on *Cydonia* QC were substantially slimmer than on *Cydonia* BA29, *Pyrus* Pyrodwarf, and Mostbirne. In Latvia the trees on *Cydonia* rootstocks didn’t differ in TCSA. However, the trees on all *Pyrus* rootstocks were much more thicker than on *Cydonia* rootstocks. In Estonian-experiment, the trees only on *Pyrus* Pyrodwarf and *Pyrus* OHF 333 were slimmer and the crown volume was smaller than these of all *Cydonia* rootstocks and Mostbirne, and Kazrausu.
Table. Trunk cross-sectional area (TCSA) after five growing seasons, yield per tree, mean fruit weight, height of trees and crown volume

Lentelė. Kamieno skerspjūvio plotas (KSP) po penkių augimo sezonų, vaismedžio derlius, vidutinė vaisiaus masė, vaismedžių aukštis ir vainiko tūris

<table>
<thead>
<tr>
<th>Rootstock</th>
<th>Lithuania / Lietuva</th>
<th>Latvia / Latvija</th>
<th>Estonia / Estija</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TCSA KSP, cm²</td>
<td>Yield, kg/tree Derlius, kg/vaism.</td>
<td>Mean fruit weight Vิดarine vaisiaus masė, g</td>
</tr>
<tr>
<td>BA29</td>
<td>32.2</td>
<td>16.5</td>
<td>159</td>
</tr>
<tr>
<td>Q C</td>
<td>23.7*</td>
<td>11.5*</td>
<td>158</td>
</tr>
<tr>
<td>Q A</td>
<td>30.2</td>
<td>13.3</td>
<td>163</td>
</tr>
<tr>
<td>Pyrodwarf</td>
<td>38.5*</td>
<td>11.4*</td>
<td>164</td>
</tr>
<tr>
<td>OHF-333</td>
<td>40.7*</td>
<td>11.0*</td>
<td>175*</td>
</tr>
<tr>
<td>Mostbirne</td>
<td>43.0*</td>
<td>9.2*</td>
<td>154</td>
</tr>
<tr>
<td>Kazrausu</td>
<td>35.2</td>
<td>8.7*</td>
<td>151</td>
</tr>
<tr>
<td>LSD 0.5</td>
<td>3.7</td>
<td>3.9</td>
<td>13.6</td>
</tr>
</tbody>
</table>

The differences in trunk diameter were found, especially in Lithuania and Estonia, during the first three years after planting; in the forth and fifth years the yearly increase was stable, without differences. In Latvia, the differences were formed in the fourth and fifth years (Fig.); this was mainly stated in the trees on Mostbirne and Kazrausu rootstocks.

![Diagram showing pear tree trunk diameter in 2003 and increase of diameter in 2004 and 2005](image_url)

Figure. Pear tree trunk diameter in 2003 and increase of diameter in 2004 and 2005

Pav. Kriausų kamieno skersmuo 2003 m. ir skersmens padidėjimas 2004 ir 2005 m.
The beginning of yield in Lithuania on Cydonia rootstocks and on Pyrodwarf was in fourth year. In Estonia, the spring night frosts killed all the flowers that year, thus the first fruits appeared a year later. In fifth year, the trees on Cydonia BA29 and QA rootstocks, both in Lithuania and Estonia, were more productive than on the other rootstocks (Table). The trees on BA29 surpassed the trees on Pyrus rootstocks by 50–70% in Lithuania and 65–90% in Estonia. The smallest yield at Polli was reported for Pyrodwarf rootstock.

Average fruit weight was reported only for Lithuania: it was substantially greater on the OHF 333 rootstock if to compare with Cydonia BA29.

Data in the literature stated that trees on Cydonia BA29 are the most vigorous among Cydonia rootstocks (Carrero, Ortiz, 1984; Weber, 2001). However, there are information that both may be the same size (Loreti et al., 2002). The latter coincide with the results in Lithuania, Latvia and Estonia. The Pyrus Pyrodwarf rootstock produces by the evaluation of the breeder (Jacob, 1998) small trees, almost similar to Cydonia QA. The rootstock Pyrus OHF 333 appeared too vigorous (Weber, 2001). In Switzerland, the trees on OHF 333 were influenced by scion but were 20-60% more vigorous than the trees on Cydonia QA (Money and Evequos, 1999).

Conclusions. The rootstocks tended to have different influence on tree size, depending on growing site.

In our experiment, the trees on Pyrus rootstocks in Lithuania and Latvia were more vigorous, but in Estonia produced smaller trees than on Cydonia BA29. The trees on Kirchensaller Mostbirne and Kazrausu varied greatly from one site to another. In Latvia and Estonia they were more vigorous than on Pyrus Pyrodwarf and Pyrus OHF 333, whereas in Lithuania there was no significant difference, presumably due to more fertile soil.

Gauta
2006 06 08
Parengtų spausdinti
2006 07 17

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**CYDONIA IR PYRUS POSKIEPIŲ PALYGINIMAS ESTIJOLE, LATVIJOJE IR LIETUVOJE**

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**Santrauka**


**Reikšminiai žodžiai:** kriausës, poskiepiai, Baltijos respublikos.