RESEARCHES REGARDING THE PARENTSTOCKS’ INFLUENCE OVER THE TREES’ WAIST FOR SOME SEED SPECIES

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Abstract

A modern fruit-trees growing has as main objective obtaining a high economical efficiency, reason why an intensive crop becomes a priority. From all factors that influence this fact, parentstocks represents one of the most important factors. (Vasile Maxim Danciu, Venig Aurora, 2004)

Parent stocks is a very significant factor in the process of producing planting material. (Ghena, 2004). An intensive crop and an efficient one represent a main object in the fruit growing process. (Chira, 2006). Parent stock represents a significant factor in the process of producing planting material, in choosing the parentstock, they are taken into consideration, the planting system, the affinity level between the chosen varieties and some parent stocks. The main reasons of this research were represented by the plum exemplaries identification that could be used as seeds in order to obtain small wasted stocks. The studies that were carried out related to the growth and fructification but also to the obtained seeds’ quality. Another objective was the seeding material behavior in the nursery and also the significant variants’ behavior in the first and second field.

Key words: relation variety-parentstock, biological base, planting material, biotypes, selected plants.

INTRODUCTION

The apricot and plum yields are influenced in the modernization process by the planting density and the relation variety-stock.

The modernization and greening of the plum crop system by finding new stocks represent the necessity of this kind of approaches.

The main reason is to capitalize natural potential by identifying local plum populations used as stocks for the North-Western part of the country.

MATERIALS AND METHODS

Wax cherry has affinity for most apricot varieties, but it has irregular growth and fructification because it is represented by several biotypes. (Draganescu, 2002)

The apricot varieties, grafted on wax cherry, do not maintain their fruit features for the grafted variety. The same happens with the variety, building the aerial part with leaves that produce the sap, nourish the roots and have a deep influence over the parent stock, over the radicular system growth. A hard variety grafted on a small wasted parent stock will develop the growth of the radicular system of the parent stocks (Venig, 2006). The grafted apricot trees are 6-8 m high, with a regular and hard block (Cepoiu,
Plum species are grafted mainly on generative parent stocks, the most important being the wax cherries and the “franc” plum (Draganescu, 2004).

The vigor of the trees is quite the same, the difference being of about 25-30% between the varieties. The absence of small sized parent stocks makes impossible the intensive crop with high density. The plum trees develop a height of 3.5 - 5 m and a diameter of 4-5 m. To obtain an intensive plantation, it is necessary to use technology (adequate treetop systems) at most 600-800 trees/ha.

In the nursery, plum trees build a good structure with the apricot trees; the varieties with yellow pulp are more suitable, as parent stocks, for the apricot (Chira, 2005). In the nursery, the plum parent stocks are more significant than the wax cherry used as parent stocks for the apricot (Venig, 2006).

The researches were carried out in the period 2005-2009 within the fruit-growing resort, the used material and technical resort being the existing one at the farm. In order to identify the small sized trees, the biological resort was used; the resort includes 10 hectares of plum and apricot seedlings, a plantation established in the spring of 1998. The main reason of this plantation was to get the necessary seeds for obtaining generative root-stocks for apricot and plum. At the beginning, an aspect taken into consideration was to widen the variety of plum parent stocks. For the plantation, there were used seedlings obtained from plum seeds “Albe mici” obtained in Marghita area. The planting distance was 4 x 4 m, with seedlings representing hybrid downwards of two Prunus insititia varieties, Iuliana and Pomarium, existing in Bihor County. Taking into consideration the hybrid genetic origin of the plum seeds, we tried to identify those small-sized, productive and drought resistant trees. 12 trees (variants) were chosen for the research, using the wax cherry (M2) and the parent stock Albe mici (M1) as control samples for comparison. The descriptive and the biological methods were used as working methods; measurements and determinations were made for the entire research period. (Botu I. & co.,1980)

RESULTS AND DISCUSSIONS

From the growing and fructification process analyses, there were registered some differences related to the size and to some morphological and biological characteristics of the seed plants but also related to the main characteristics of the fruits used in the nursery (Tab.1). After an overall analysis of all parameters taken into consideration for the plum seeds but also of the seeds and seedlings behavior (Tab.2,Tab.3), it resulted that the
significant products which meet the object and the research and production reason have only the following selections: 20/17, 20/22, 50/46 and 25/25.

“Albe mici” is a cloned selection from several seedlings after a free pollination of a biotype from Prunus insititia Juss, approved as generative parent stocks for apricot trees in 1991. (Stefan N., 1952)

The size, production and efficiency for obtaining one kg of seeds from the identifies plum seeds (2005 production)

<table>
<thead>
<tr>
<th>Seed</th>
<th>The trunk section surface</th>
<th>Kg production / tree</th>
<th>Obtained seeds quantity</th>
<th>Fruit quantity for one kg seeds</th>
<th>Report pulp/ seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>20/17</td>
<td>63.6</td>
<td>68</td>
<td>3.800</td>
<td>17.9</td>
<td>94.4/5.6</td>
</tr>
<tr>
<td>20/22</td>
<td>105.5</td>
<td>37</td>
<td>1.900</td>
<td>19.7</td>
<td>94.9/5.1</td>
</tr>
<tr>
<td>21/21</td>
<td>102.0</td>
<td>35</td>
<td>2.000</td>
<td>17.5</td>
<td>94.3/5.7</td>
</tr>
<tr>
<td>21/25</td>
<td>88.0</td>
<td>63</td>
<td>1.760</td>
<td>35.1</td>
<td>97.2/2.8</td>
</tr>
<tr>
<td>22/18</td>
<td>94.8</td>
<td>46</td>
<td>1.500</td>
<td>30.0</td>
<td>96.7/3.3</td>
</tr>
<tr>
<td>24/5</td>
<td>109.2</td>
<td>47</td>
<td>2.220</td>
<td>21.1</td>
<td>95.3/4.7</td>
</tr>
<tr>
<td>24/31</td>
<td>78.5</td>
<td>29</td>
<td>1.370</td>
<td>21.0</td>
<td>95.3/4.7</td>
</tr>
<tr>
<td>25/19</td>
<td>72.2</td>
<td>31</td>
<td>0.700</td>
<td>43.4</td>
<td>97.7/2.3</td>
</tr>
<tr>
<td>25/25</td>
<td>52.7</td>
<td>23</td>
<td>1.250</td>
<td>18.2</td>
<td>94.6/5.4</td>
</tr>
<tr>
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<td>55.3</td>
<td>23</td>
<td>0.650</td>
<td>36.1</td>
<td>97.2/2.8</td>
</tr>
<tr>
<td>50/20</td>
<td>72.2</td>
<td>12</td>
<td>0.325</td>
<td>36.9</td>
<td>97.3/2.7</td>
</tr>
<tr>
<td>50/46</td>
<td>78.5</td>
<td>53</td>
<td>2.200</td>
<td>24.1</td>
<td>95.8/4.2</td>
</tr>
<tr>
<td>Medium (Mt)</td>
<td>81.0</td>
<td>38.9</td>
<td>1.640</td>
<td>26.75</td>
<td>95.9/4.1</td>
</tr>
<tr>
<td>M1 – Albe mici</td>
<td>80</td>
<td>4.320</td>
<td>18.5</td>
<td>92.0/8.0</td>
<td></td>
</tr>
<tr>
<td>M2 – wax cherry</td>
<td>58</td>
<td>3.152</td>
<td>18.0</td>
<td>94.5/5.5</td>
<td></td>
</tr>
</tbody>
</table>

Results related to the increased seedlings percentage

<table>
<thead>
<tr>
<th>Seed (variant)</th>
<th>Increasing percentage %</th>
<th>Relative percentage %</th>
<th>Differences + (d)</th>
<th>t</th>
<th>DL 5%</th>
<th>P 5%</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>20/17</td>
<td>63</td>
<td>166.2</td>
<td>+25.1</td>
<td>4.13</td>
<td>12.34</td>
<td>32.5</td>
<td>xxx</td>
</tr>
<tr>
<td>20/22</td>
<td>70.25</td>
<td>185.3</td>
<td>+32.35</td>
<td>5.32</td>
<td>12.34</td>
<td>32.5</td>
<td>xxx</td>
</tr>
<tr>
<td>21/21</td>
<td>35.25</td>
<td>93.0</td>
<td>-2.65</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21/25</td>
<td>20.2</td>
<td>53.3</td>
<td>-17.7</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22/18</td>
<td>25</td>
<td>66.0</td>
<td>-12.9</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24/5</td>
<td>28.75</td>
<td>75.8</td>
<td>-9.15</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24/31</td>
<td>22.75</td>
<td>60.0</td>
<td>-15.15</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25/19</td>
<td>30.75</td>
<td>81.1</td>
<td>-7.15</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25/25</td>
<td>41.75</td>
<td>110.1</td>
<td>+3.85</td>
<td>0.63</td>
<td>12.34</td>
<td>32.5</td>
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<tr>
<td>49/37</td>
<td>39</td>
<td>102.9</td>
<td>+1.1</td>
<td>0.18</td>
<td>12.34</td>
<td>32.5</td>
<td></td>
</tr>
<tr>
<td>50/20</td>
<td>35</td>
<td>92.3</td>
<td>-2.9</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50/46</td>
<td>43</td>
<td>113.4</td>
<td>-5.1</td>
<td>0.83</td>
<td>12.34</td>
<td>32.5</td>
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</tr>
<tr>
<td>Medium</td>
<td>37.9</td>
<td>100</td>
<td>Mt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DL 5% = 12.34; DL 1% = 16.53; DL 0.1% = 21.82

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Parnia established the optimum planting distances for apricot trees in the nursery (Parnia P., 1977). Regarding the seedlings percentage in the nursery, this value is situated between 1800 and 2000 kg, that has a springing percentage of 60-70% (Dutu I., 1994).

Table 3

<table>
<thead>
<tr>
<th>Seed</th>
<th>Seed pieces</th>
<th>Raised pieces</th>
<th>Harvested pieces</th>
<th>STAS pieces</th>
<th>On 1m² pieces</th>
<th>On 1ha thousand pieces</th>
<th>STAS thousand pieces</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>20/17</td>
<td>8824</td>
<td>5519</td>
<td>4584</td>
<td>2063</td>
<td>70</td>
<td>700</td>
<td>315</td>
<td>45</td>
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<tr>
<td>20/22</td>
<td>4476</td>
<td>2674</td>
<td>2350</td>
<td>940</td>
<td>72</td>
<td>720</td>
<td>288</td>
<td>40</td>
</tr>
<tr>
<td>21/21</td>
<td>3714</td>
<td>1211</td>
<td>806</td>
<td>484</td>
<td>25</td>
<td>250</td>
<td>150</td>
<td>60</td>
</tr>
<tr>
<td>21/25</td>
<td>5781</td>
<td>877</td>
<td>502</td>
<td>241</td>
<td>20</td>
<td>200</td>
<td>96</td>
<td>48</td>
</tr>
<tr>
<td>22/18</td>
<td>3508</td>
<td>664</td>
<td>460</td>
<td>230</td>
<td>18</td>
<td>180</td>
<td>90</td>
<td>50</td>
</tr>
<tr>
<td>24/5</td>
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<td>672</td>
<td>429</td>
<td>215</td>
<td>15</td>
<td>150</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>24/31</td>
<td>2629</td>
<td>544</td>
<td>408</td>
<td>216</td>
<td>20</td>
<td>200</td>
<td>106</td>
<td>53</td>
</tr>
<tr>
<td>25/19</td>
<td>1495</td>
<td>324</td>
<td>182</td>
<td>106</td>
<td>32</td>
<td>320</td>
<td>186</td>
<td>58</td>
</tr>
<tr>
<td>25/25</td>
<td>3531</td>
<td>1346</td>
<td>955</td>
<td>573</td>
<td>67</td>
<td>670</td>
<td>402</td>
<td>60</td>
</tr>
<tr>
<td>49/37</td>
<td>1520</td>
<td>683</td>
<td>477</td>
<td>291</td>
<td>33</td>
<td>330</td>
<td>201</td>
<td>61</td>
</tr>
<tr>
<td>50/20</td>
<td>515</td>
<td>188</td>
<td>185</td>
<td>102</td>
<td>38</td>
<td>380</td>
<td>209</td>
<td>55</td>
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<td>50/46</td>
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<td>555</td>
<td>47</td>
<td>470</td>
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</tr>
<tr>
<td>Medium</td>
<td>3625</td>
<td>1403</td>
<td>1026</td>
<td>501</td>
<td>38</td>
<td>381</td>
<td>199</td>
<td>53,1</td>
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<tr>
<td>M₁ – Albe mici</td>
<td>400</td>
<td>127</td>
<td>100</td>
<td>87</td>
<td>40</td>
<td>400</td>
<td>348</td>
<td>87</td>
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<tr>
<td>M₂ – wax cherry</td>
<td>400</td>
<td>230</td>
<td>190</td>
<td>138</td>
<td>70</td>
<td>700</td>
<td>420</td>
<td>60</td>
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</tbody>
</table>

The behavior in the first and second field of the selected seedlings as parent stocks for plum, of the four biotypes, selected after the obtained seedlings, was researched by organizing a trifactorial experience (4 x 2 x 3), where the graduation of factor A (the parent stocks) appears just once, of factor B (the varieties) twice and of factor C (the soil) six times. In the first field 3 plum varieties (Comandor, Sirena, Favorit) were grafted. The grip percentage, the percentage for gripped eyes and those remained in vegetation were researched (Tab 4).

In the first field 3 plum varieties (Tulen gras, Stanley and Anna Spath) were grafted. The grip percentage, the percentage for gripped eyes and those remained in vegetation were researched (Tab 4).

For apricot trees, the values of the varieties were close to the control sample regarding the increased seedlings percentage which had also been proven by Prica D., Catavela St.(1961).
Table 4

<table>
<thead>
<tr>
<th>Species</th>
<th>Variety</th>
<th>Parent stock</th>
<th>Control Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>20/17</td>
<td>20/22</td>
</tr>
<tr>
<td>Apricot</td>
<td>Comandor</td>
<td>47</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>Sirena</td>
<td>44</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Favorit</td>
<td>33</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>41.33</td>
<td>37.33</td>
</tr>
</tbody>
</table>

Gripping eyes (in spring 2008) %

<table>
<thead>
<tr>
<th>Species</th>
<th>Variety</th>
<th>Parent stock</th>
<th>Control Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>20/17</td>
<td>20/22</td>
</tr>
<tr>
<td>Apricot</td>
<td>Comandor</td>
<td>27</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Sirena</td>
<td>25</td>
<td>17</td>
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<tr>
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<td>Favorit</td>
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<td>22</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>24.00</td>
<td>24.33</td>
</tr>
</tbody>
</table>

Table 5

<table>
<thead>
<tr>
<th>Species</th>
<th>Variety</th>
<th>Parent stock</th>
<th>Control Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>20/17</td>
<td>20/22</td>
</tr>
<tr>
<td>Plum</td>
<td>Tulen gras</td>
<td>74</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Stanley</td>
<td>54</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>Anna Spath</td>
<td>75</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>67.66</td>
<td>55.33</td>
</tr>
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</table>

Gripping eyes (in spring 2008) %

<table>
<thead>
<tr>
<th>Species</th>
<th>Variety</th>
<th>Parent stock</th>
<th>Control Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plum</td>
<td>Tulen gras</td>
<td>57</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Stanley</td>
<td>37</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Anna Spath</td>
<td>57</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>50.33</td>
<td>37.00</td>
</tr>
</tbody>
</table>

For the apricot varieties, the percentage was almost concurrent with that for the parent stock, the highest gripping percentages were registered for the selections 50/46 and 25/25 for all species (44-48%, 42-52%). The Comandor variety registered the best behavior on all four parent stocks sections.

Concerning the gripping percentage, the varieties Tulen gras and Anna Spath registered results when they were grafted on the selection 20/17; for Stanley the best parent stock seemed to be the selection 50/46.
Related to the growing dynamics, the grafted varieties have different intensities in the first stage, the 20/17 and 25/25 parent stocks having a constant growing rate.

The length growing dynamics correspond with the fact that the parent stocks 50/46 and 20/17 registered the lowest growth. All apricot varieties registered a low growth on all 4 parent stock selections as compared to Albe mici plums and wax cherry.

The best period for grafting the apricot trees is the first decade of August, a period also recommended by Venig A.(2006)

The behavior of apricot trees on different parent stocks was also studied by Popescu M.(1977), Botez M. (1962), and Sonea V.(1963).
Table 8

The evolution of the trees production in the second field

<table>
<thead>
<tr>
<th>Parent stock</th>
<th>Variety</th>
<th>Medium production for ha</th>
<th>STAS %</th>
</tr>
</thead>
<tbody>
<tr>
<td>20/17</td>
<td>Comandor</td>
<td>25.9</td>
<td>78.4</td>
</tr>
<tr>
<td></td>
<td>Sirena</td>
<td>24.2</td>
<td>80.5</td>
</tr>
<tr>
<td></td>
<td>Favorit</td>
<td>18.1</td>
<td>86.7</td>
</tr>
<tr>
<td></td>
<td>x</td>
<td>22.7</td>
<td>81.5</td>
</tr>
<tr>
<td>20/22</td>
<td>Comandor</td>
<td>29.2</td>
<td>80.5</td>
</tr>
<tr>
<td></td>
<td>Sirena</td>
<td>16.0</td>
<td>88.1</td>
</tr>
<tr>
<td></td>
<td>Favorit</td>
<td>16.5</td>
<td>86.7</td>
</tr>
<tr>
<td></td>
<td>x</td>
<td>20.5</td>
<td>84.4</td>
</tr>
<tr>
<td>25/25</td>
<td>Comandor</td>
<td>30.3</td>
<td>86.8</td>
</tr>
<tr>
<td></td>
<td>Sirena</td>
<td>25.8</td>
<td>87.2</td>
</tr>
<tr>
<td></td>
<td>Favorit</td>
<td>23.1</td>
<td>90.0</td>
</tr>
<tr>
<td></td>
<td>x</td>
<td>26.4</td>
<td>87.9</td>
</tr>
<tr>
<td>50/56</td>
<td>Comandor</td>
<td>24.2</td>
<td>86.0</td>
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<td></td>
<td>Sirena</td>
<td>24.8</td>
<td>80.6</td>
</tr>
<tr>
<td></td>
<td>Favorit</td>
<td>26.4</td>
<td>72.3</td>
</tr>
<tr>
<td></td>
<td>x</td>
<td>25.1</td>
<td>81.3</td>
</tr>
<tr>
<td>Medium mt</td>
<td>Comandor</td>
<td>27.4</td>
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The evolution of the trees production in the second field

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<th>Variety</th>
<th>Medium production for ha</th>
<th>STAS %</th>
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</table>

Analyzing the number of the grafted trees, there were some similarities with regard to apricot selections 25/25 and 50/46, for Comandor and Favorit varieties, which registered the highest production. The production quality (STAS trees) was higher in case of the selections 25/25 and 20/22. A good quality material was met for the Comandor variety (Nica St., 1998, Parnia P. et al., 1977)

The highest production was registered at the parent stock 20/17 for Tuleu gras and Anna Spath. The production quality (STAS) was high for the selections 50/46.
CONCLUSIONS

The selection 20/17 meets the desired nursery parameters and registers the best results in order to obtain a small wasted planting material.

As a parent stock, the plum franc builds uniform middle and low sized trees for apricot, as it was also proven by Cepoiu in 1982.

The selection 50/46 meets the desired nursery parameters and registers the best results in order to obtain a small sized planting material.

REFERENCES