OWN-ROOTED CHANDLER VS CHANDLER ON PARADOX ROOTSTOCK

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ABSTRACT

Own-rooted English walnut trees may have potential in areas where other rootstocks are undesirable because of hypersensitivity to cherry leafroll virus. A trial planted in 1991 compares micropropagated ‘Chandler’ on its own root vs. ‘Chandler’ on seedling Paradox rootstock. In 1998, as in previous years, own-rooted ‘Chandler’ had significantly greater trunk circumference and yield than did ‘Chandler’ on Paradox rootstock. Although own-rooted ‘Chandler’ continue to yield three times more than ‘Chandler’ on Paradox rootstock, there were problems with poor growth and dieback on some trees in 1998. The cause of dieback in one own-rooted tree was due to lesion nematode.

OBJECTIVES

To compare the performance of micro propagated ‘Chandler’ on its own root vs. ‘Chandler’ grafted on Paradox rootstock.

PROCEDURES

In 1991, a trial comparing micro propagated ‘Chandler’ to nursery grafted ‘Chandler’ on Paradox rootstock was initiated in Sutter County. The treatments are: 1) ‘Chandler’ on own-root, and 2) ‘Chandler’ on Paradox rootstock. There are twenty single tree replicates per treatment in a randomized complete block design spaced at 25' x 25'. Own-rooted trees have had little pruning since the third leaf. Poorly growing trees on Paradox have been pruned to stimulate growth. Evaluations were made on trunk circumference, yield and nut quality. Trunks were measured at 24 inches above the ground.

The lower crown and upper roots were exposed in October on an own-rooted tree with dieback and an adjacent stunted tree on Paradox rootstock. Soil and root samples were submitted for nematode and Phytophthora analysis.

RESULTS AND DISCUSSION

The trunk circumference was significantly greater for the own-rooted ‘Chandler’ compared to ‘Chandler’ on Paradox in 1995 through 1998 when measured at 24 inches above the ground (Table 1). Yields have been significantly higher in own-rooted ‘Chandler’ from 1995 through 1998 (Table 2). Yield efficiency was significantly higher in own-rooted ‘Chandler’ from 1995 through 1997. Although yield in the own-rooted trees continues to be three times greater than trees on Paradox rootstock, there was a high amount of variability among individual tree yields. The non-significant yield efficiency in 1998 is due to this yield variability. Most of the own-rooted trees are extremely vigorous but during this past season, one own-rooted tree started dying.
back, two others had no new late season shoot growth, and two are small trees. These trees had very low yields. Also, there continues to be some very poorly performing trees on Paradox seedling. Root and soil samples from the own rooted tree with dieback and a stunted tree on Paradox rootstock were negative for Phytophthora. However, lesion nematodes (Pratylenchus sp.) were present in the roots and in high numbers in the soil (avg. 9300/liter) from the own rooted tree. The tree on Paradox rootstock had lesion nematodes in the soil but in much lower numbers (700/liter). It appears that this own-rooted tree is severely affected by lesion nematode. More samples have been taken from other low-vigor, own-rooted trees to determine if lesion nematodes are causing the problem. Nut quality data for 1998 will be included in next years report.

Own-rooted trees continue to out perform the Chandler on Paradox rootstock. However, 1998 was the first year that problems were seen in the own-rooted trees. This trial needs to be continued for several more years to determine the full extent that lesion nematodes or other problems may affect these trees.

ACKNOWLEDGMENTS

We are grateful to Joe Conant of the Whitney Warren Ranch for his assistance and continued cooperation on this project.

Table 1. Trunk Circumference (cm) for 1995-1998 and 1997-98 Trunk Cross Sectional Area (TCSA)

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<tr>
<td>OWN-ROOTED</td>
<td>38.2 a</td>
<td>50.0 a</td>
<td>59.8 a</td>
<td>64.3 a</td>
<td>294 a</td>
<td>340 a</td>
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<tr>
<td>ON PARADOX</td>
<td>27.3 b</td>
<td>32.7 b</td>
<td>37.9 b</td>
<td>41.4 b</td>
<td>123 b</td>
<td>146 b</td>
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Means followed by the same letter in a column are not significantly different (LSD P ≤ 0.05)

Table 2. Yield in lbs./Tree from 1995-1998 and 1997-98 Yield Efficiency (YE)

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<tr>
<td>OWN-ROOTED</td>
<td>23.9 a</td>
<td>51.6 a</td>
<td>95.2 a</td>
<td>64.2 a</td>
<td>.317 a</td>
<td>.175 a</td>
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<tr>
<td>ON PARADOX</td>
<td>9.3 b</td>
<td>17.5 b</td>
<td>31.4 b</td>
<td>22.3 b</td>
<td>.241 b</td>
<td>.138 a</td>
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Means followed by the same letter in a column are not significantly different (LSD P ≤ 0.05)