A COMPARISON OF THE MINIMUM PRUNING AND THE
LOW-SCAFFOLD TREE TRAINING SYSTEMS ON CHANDLER WALNUTS

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ABSTRACT

In a 1996 planting of June-budded Chandler walnut trees, half on paradox and half on Northern California (N.C.) black walnut rootstock, a comparison is being made between the traditional minimum pruning training system and a system that utilizes low and numerous scaffold branches. The low-scaffold training system had about 9 scaffolds per tree after the second dormant pruning while minimum pruning had about 5 scaffolds. Yields of low-scaffold trained trees were double that of minimum pruning trained trees and were statistically significant. Percent increase in trunk cross sectional area (TCSA) was statistically larger on the low-scaffold trees when comparing trees on paradox rootstock but only numerically larger on N.C. black rootstock trees.

OBJECTIVES

Many growers in Butte County have adapted or are considering adapting a training system developed by the Barton Family that reportedly increases early production as well as tree size. Although reports of higher production are commonplace, from growers using the low-scaffold training system, many growers in Butte County have encouraged the authors to collect "scientific" data in a replicated trial on this training system. The objective of this trial is to collect yield and tree performance data in a replicated trial comparing this “low-scaffold” training system with the more traditional “minimum pruning” training system.

PROCEDURES

In a 1996 planting of vigorous growing June-budded Chandler walnut trees, establish a trial comparing low-scaffold training to minimum pruning training systems on both paradox and N.C. black walnut rootstock. Six, nine-tree replicates of these two training systems were established on paradox and N.C. black walnut rootstock. The first dormant season all trees were pruned the same way by heading them about 8-10 feet above ground and following standard procedures concerning neck buds, suckers, etc. The second dormant pruning is when the two systems differentiate. In summary, low-scaffold training keeps virtually all-horizontal scaffolds developing 3 or more feet above ground, removing only vertical or angled scaffolds that will interfere with the growth of the leader. All vigorous scaffolds are headed ½ or more of current seasons growth, non-vigorous growth (less than three feet long are left unheaded). The leader is also headed. The minimum
pruning system removes all scaffold development below 5½ - 6' above ground, chooses 4-6 "properly placed" scaffolds on the leader between 5½ - 10 feet above ground, heads them by ⅓ or more of current seasons growth and leaves undesirable or short growing scaffolds alone for early fruit production. The leader is also headed. Summer tipping of scaffold branches on the low-
scaffold system, although used in some areas, was not used here because it has not been found necessary. Dormant pruning in the 3rd and subsequent winters consists of continued heading of all the scaffolds on the low-
scaffold system until they reach a desirable size. Short non-vigorous growth is left unheaded. Eventually the low-scaffolds, below 5½ feet, are removed once they lose vigor and begin to shade out. Dormant pruning in the 3rd and subsequent winters on minimally pruned trees consists of continued heading of desirable scaffold branches until they reach a desirable size. Some short non-vigorous branches and undesirable scaffold branches are left unheaded.

First year nut yield measurements and second year TCSA measurements were taken this year. TCSA measurements were taken 20 cm. above the bud union.

RESULTS

All first year results are shown in Table 1. As expected the low-scaffold training system had considerably more scaffolds then did the minimum training system. Low-scaffold trained trees whether on paradox or N.C. black walnut rootstock had statistically more scaffolds than the minimum pruned trees on paradox or N.C. black walnut rootstock. The low-scaffold trees on paradox and N.C. black walnut rootstock had statistically greater yield than trees minimally pruned. The percent increase in TCSA from fall 1997 to fall 1998 was greatest on low-scaffold trained trees with significant differences occurring between low-scaffold trained paradox rootstock trees and minimally pruned trees on paradox and N.C. black walnut rootstock. Minimally pruned trees on paradox rootstock had the poorest percent increase in TCSA. However, these trees also had the fewest number of scaffold branches and therefore leaf area.

DISCUSSION

Although yield is low this first year these results are consistent with grower reports and observation trials conducted in recent years. Next year on four-year-old trees we would expect a yield increase of 20-30 percent, perhaps in the 1000-1500 lb./acre range. The additional scaffolds and leaf surface not only enhances productivity but also provide nutrients to the tree creating increased growth as compared to the minimum pruning system. This is most clear when comparing the low-scaffold and minimum pruned trained trees on paradox rootstock.
Table 1. Comparison between Low-Scaffold and Minimum Pruning Training System

<table>
<thead>
<tr>
<th>Pruning System</th>
<th>Type of Rootstock</th>
<th># of Scaffolds</th>
<th>Yield (dry lbs./tree)</th>
<th>% TCSA increase 1997-1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Scaffold</td>
<td>Paradox</td>
<td>10.5 A</td>
<td>1.3 A</td>
<td>181.68 A</td>
</tr>
<tr>
<td>Low Scaffold</td>
<td>N.C. Black</td>
<td>8.4 B</td>
<td>1.1 A</td>
<td>172.58 AB</td>
</tr>
<tr>
<td>Minimum</td>
<td>Paradox</td>
<td>4.0 D</td>
<td>.7 B</td>
<td>136.77 C</td>
</tr>
<tr>
<td>Minimum</td>
<td>N.C. Black</td>
<td>6.2 C</td>
<td>.5 B</td>
<td>166.42 B</td>
</tr>
<tr>
<td>% increase w/ Low-Scaffold Training</td>
<td>Paradox</td>
<td>162.5</td>
<td>85.7</td>
<td>32.8</td>
</tr>
<tr>
<td>% increase w/ Low-Scaffold Training</td>
<td>N.C. Black</td>
<td>35.5</td>
<td>120</td>
<td>3.7</td>
</tr>
</tbody>
</table>

Means not followed by the same letter are significantly different at the 5% level by Duncan’s Multiple Range Test For Mean Separation.

comp.min.prun.low.scaf.sys.

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