ABSTRACT

In a 1996 planted Chandler orchard with vigorous growth, the low-scaffold training system increased yield for four consecutive years and initially resulted in larger trunk cross sectional areas (TCSA) when compared to standard trained trees. After the eighth leaf the yield and tree size increases have become equal between both training systems. Yields on paradox rootstock continue to surpass yields on N.C. black rootstock even though the TCSA is similar for trees on both rootstocks. Since the yield and tree growth advantages of the low scaffold training system have been fully accounted for this is the final report on comparing these two tree training systems.

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 vigorously growing June-budded Chandler walnut trees, a trial was established 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 and prunes (heads) back virtually all-horizontal scaffolds developing 3 or more feet above ground and removing only vertical or angled scaffolds that will interfere with tree growth. Non-vigorous growth less than three feet long is left unheaded. The leader is also headed. The minimum pruning system removes all scaffold development below 5.5-6.0 feet above ground, chooses 4-6 “properly placed” scaffolds on the leader between 5.5 – 10 feet above ground, head them by 1/3 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 is performed where needed until they reach a desirable size and shape.
Eventually the low-scaffolds, below 5.5 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.

Both yield measurements and trunk cross sectional area (TCSA) measurements were taken in 2003. Yield measurements are expressed as mean pounds of hulled, dried nuts per tree. TCSA measurements were calculated from measurements taken 20 cm. above the graft union.

RESULTS

For the first time there was no significant difference in yield between the two pruning systems on paradox rootstock. There was also no significant difference in yield between the two pruning systems on N.C. Black rootstock for the second year in a row. There also was a significant difference in yield between the trees on N.C. Black rootstocks and the trees on Paradox rootstocks. For the five consecutive years that yield data was collected the low scaffold treatment accumulated over a ton of additional production on paradox rootstock and over half a ton of additional production on N.C. black walnut rootstock as compared to trees on the minimal tree training system (Table 1).

Tree trunk size of Chandler on N.C. Black and Chandler on Paradox were not significantly different for either pruning system. (Table 1).

Although nut quality data was collected evaluation was not available at the time this report was due.

Table 1: Performance of Chandlers Grown Under Two Different Pruning Regimes

<table>
<thead>
<tr>
<th>Rootstock</th>
<th>Pruning System</th>
<th>Mean Yield Lbs/Tree</th>
<th>Mean Yield (Tons/Acre)</th>
<th>Accumulated Yield (Tons/Acre)</th>
<th>Mean TCSA (cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paradox</td>
<td>Low-Scaffold</td>
<td>150.4 a</td>
<td>3.61 a</td>
<td>11.24 a</td>
<td>490.15 a</td>
</tr>
<tr>
<td>Paradox</td>
<td>Minimal</td>
<td>150.8 a</td>
<td>3.62 a</td>
<td>10.17 b</td>
<td>534.05 a</td>
</tr>
<tr>
<td>N.C. Black</td>
<td>Low Scaffold</td>
<td>107.8 b</td>
<td>2.57 b</td>
<td>7.64 c</td>
<td>478.28 a</td>
</tr>
<tr>
<td>N.C. Black</td>
<td>Minimal</td>
<td>105.4 b</td>
<td>2.53 b</td>
<td>6.99 c</td>
<td>546.34 a</td>
</tr>
</tbody>
</table>

Treatment means not followed by a common letter are significantly different at the 5 % Level according to Duncan’s Multiple Range Test for Mean Separation.
DISCUSSION

In this young Chandler orchard with vigorous growth, the low scaffold training system significantly increased yields for trees on paradox rootstock for four consecutive years and for three consecutive years on N. C. black walnut rootstock. There was no difference between the two training systems for trees on either rootstock last year on N.C. black walnut rootstock or on either rootstock this year. On paradox rootstock the accumulative yield increase of low scaffold training was 1.07 tons per acre or 535 pounds per acre per year average. On N.C. black walnut rootstock the accumulative yield increase of low scaffold training was 0.65 tons per acre or 433 pounds per acre per year average. Both pruning systems on paradox out yielded both pruning systems on N.C. Black rootstock. There has been no difference between the two pruning systems or between the two rootstocks in terms of tree size (TCSA) for the past two years.

Results from this trial suggest that the yield and tree size advantage of having low scaffold branches on Chandler walnuts exist only through the seventh leaf. On N.C. black walnut rootstock this advantage exist only through the sixth leaf.

Since the low scaffold branches did not contribute additional production on the N.C. black walnut rootstock for two years and on the paradox rootstock trees this year, and since tree size in all treatments is virtually the same, the advantage of having the low branches no longer exist and this trial is now concluded.