PRUNING FIRST YEAR WALNUT TREES

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ABSTRACT

Vigorous one year old Chandler and Howard walnut trees were pruned at four dates during the winter and spring. The number of buds that started growth in the spring was evaluated. Thirty-two per cent more buds on Chandler and 41% more buds on Howard started growing when pruned just before normal bud growth in the spring than when the trees were pruned when dormant in the winter. The major increase occurred between the last two pruning dates of March 5 and April 8. Removing the top bud when there were two buds in the leaf axil immediately below the heading cut significantly increased the number of buds growing on Howard and slightly but not significantly increased the number of buds growing on Chandler.

OBJECTIVES

Growers have changed how young trees are pruned. Today most growers try to achieve vigorous growth from newly planted trees. Many growers are achieving 10 to 15 feet of growth the first year following planting on either trees grafted in the nursery before transplanting or trees that were patch budded or whip grafted in the field on established rootstocks. On very vigorous trees it is desirable to have multiple limbs grow the second year. These limbs provide good selections for scaffolds and also temporary limbs that can be kept a few years for early production.

Older publications on walnut pruning or tree training suggest delaying winter pruning until after the buds swell in the spring so that a grower can visually see any damage from frost to the trees. More recently growers try to prune their young trees when there is available labor. At the time of pruning the necked buds and any lateral buds are removed. In this experiment the top bud in the leaf axil was removed if there were two buds present whether or not it had an extended stem (necked bud) so that all leaf axils contained only a single bud.

PROCEDURES

These experiments were conducted to see if there are differences in the number of buds that grow depending on the time during the dormant season the trees were pruned and the necked buds removed. Trees were pruned on four different dates approximately 33 days apart in both a Chandler orchard and a Howard orchard. The trees had been planted in the spring, 2001 as ungrafted rootstocks. The trees were patch budded in the fall, 2001. The shoots growing from the patch buds were tied to a stake and allowed to grow in 2002.

In the winter 2002 / 03 the trees were divided into a randomized complete block design. Only trees that were at least 9 feet tall were used in the experiment. Each block contained eight single tree plots. The factorial experiment was designed with the four pruning dates as the primary comparison. The second factor was whether the top (necked) bud just below the headed leader was removed or not removed. On each tree all of the necked buds and the primary bud of any
two buds growing from the leaf axil except the first bud below the cut on the trunk were removed. If there was only a single bud in the axil it was not removed.

All trees were headed or cut at approximately 6 feet on the Howards and at 6½ feet on the Chandlers. The height varied slightly. The heading cut was into wood that was solid and round. All pruning and bud removal was done on the specific date of treatment.

The top bud that was kept on all trees was composed of two buds in the axil. If there was not two buds present the tree was pruned either higher or lower so that there were two buds present in the top leaf axil. One half the trees had the first bud in the top leaf axil removed. The other half of the trees did not have this bud removed so had two buds at the top axil.

The factorial experiment had two different factors:

1. Date of heading

2. Top bud (necked) removed or not
   a. Bud removed.
   b. Bud not removed.

Evaluation occurred on May 7, 2003. The total number of buds that were growing above the graft union was counted. Suckers growing from the rootstock were not counted. Most of the trees were grafted at a height of 24 to 30 inches although a few were grafted slightly lower. Most of the growing limbs were from 4 to 10 inches long at the time of evaluation. All limbs were growing vigorously and were expected to continue to grow for the season. The Chandler and Howard varieties were analyzed separately. The Chandler experiment had 17 replicates and the Howard experiment had 21 replicates.

RESULTS AND DISCUSSION

Buds that were removed at the first two dates were very difficult to remove. Most had to be cut. Buds were the easiest to remove on the April 8 date. It is unknown how pruning in the winter and then bud removal at a later date in the spring would affect the number of buds that would grow as this factor was not included in these experiments.

Average number of buds per tree that grew by May 7, 2003

<table>
<thead>
<tr>
<th>Date of pruning</th>
<th>Chandler</th>
<th>Howard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec. 30, 2002</td>
<td>11.12 a *</td>
<td>7.83 a</td>
</tr>
<tr>
<td>Jan. 31, 2003</td>
<td>11.97 ab</td>
<td>7.79 a</td>
</tr>
<tr>
<td>March 5, 2003</td>
<td>12.44 b</td>
<td>9.28 b</td>
</tr>
<tr>
<td>April 8, 2003</td>
<td>14.74 c</td>
<td>11.02 c</td>
</tr>
</tbody>
</table>

*numbers followed by a different letter are significant at 0.05%. (Fisher’s LSD).
### Average number of buds per tree that grew by May 7, 2003

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Chandler</th>
<th>Howard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top bud removed</td>
<td>12.75</td>
<td>9.37 *</td>
</tr>
<tr>
<td>Top bud not removed</td>
<td>12.38</td>
<td>8.59</td>
</tr>
</tbody>
</table>

- significant at @ 0.05% (Fisher’s LSD).

There was an average of 3.62 more limbs that grew on the Chandler trees that were pruned at the last pruning date of April 8 than the first pruning date of December 30. This was a 32% increase in limbs over the 99 days. There was a slight numeric difference between Dec. 30 and Jan. 31, but it was not significant. There was a significant difference between Dec 30 and March 5. The biggest increase was in the last month where the increase was 2.3 more limbs or an 18% increase. The buds were swollen at the last pruning date.

There was an average of 3.19 more limbs that grew on the Howard trees pruned at the last pruning date than on the first pruning date. This was a 40.7% increase in limbs over the 99 days. There was no difference between the first pruning date of Dec. 30 and the second pruning date of Jan. 31. While there was a slight difference in the two dates for Chandler it was not significantly different. The biggest difference occurred in the last 33 days although both Chandlers and Howards had a significant difference also between the Dec. 30 and the March 5 dates. In the last 34 days, there was an increase of 1.74 limbs or 19% in the Howards. This was the same rate of increase as seen in Chandlers.

The approximate three limb difference in the number of limbs growing between Chandler and Howard at any given date could not be evaluated statistically as the cultivars were in separate adjoining blocks. The blocks were owned by the same grower and management was very similar during the two years of development. Both orchards were growing on similar Class 1 soil. Howard is generally a weaker growing tree than Chandler, although in this experiment the Howard trees appeared to be as vigorous and as tall before pruning. Howard trees were topped at approximately 6 feet which was about 6 inches shorter than Chandler. This could have influenced the number of buds that were available to grow.

Although the removal of the top bud on Chandler did not cause a significant increase in the number of limbs that grew there was a trend toward more limbs. Removal of the top bud on Howard gave a significant increase in the number of limbs that grew. There was no interaction between the date of pruning and removal of the top bud.

Generally, in many trees the top bud has apical dominance or apical control. When the top bud is removed by pruning it releases many of the lower buds from this control. In the case of winter pruning of one-year-old strong shoots the apical control of the terminal bud is removed. If this removal is done early in the winter perhaps the tree has time to build up the hormones for apical control in the remaining top bud. If the pruning is done late there will not be as much buildup. The same may be hypothesized on the top bud removal. Even though the top of the tree and apical bud is cut off, the bud that becomes the top bud will exhibit partial control. When this bud is also removed the second bud at this axil becomes the top bud but it is in a much more dormant state and would not grow unless the top bud was removed, therefore it probably has less control than the primary or necked bud.
From these experiments it is apparent that delaying pruning and necked bud removal on one-year-old walnut trees until just before leafing in the spring will increase the number of buds that grow. It is also easier to remove the necked buds at this late date. While growers can cut above the buds to stimulate them to grow it takes skill and time to perform this operation successfully.

Bud growth was delayed a few days by the late pruning. By the time of evaluation a slight delay could still be observed but by July shoot growth appeared to be similar in length. In areas where spring frost occur a delay in growth might be an advantage.