EFFECTS OF SUMMER PRUNING ON TULARE WALNUT CANOPY LIGHT INTERCEPTION AND YIELDS

Bruce Lampinen, David Ramos, Wilbur Reil, and Samuel Metcalf

ABSTRACT

Summer pruning has been suggested as a means of controlling excessive vegetative vigor in dense hedgerow walnut plantings. An experiment was initiated in the summer of 2000 in a 10-year-old Tulare orchard to test whether or not summer pruning could help alleviate excessive vegetative growth without negatively impacting yields. The orchard was planted in a hedgerow configuration at 11.5 feet within the row and 24 feet between rows. Summer pruning did not appear to provide any benefits as it led to a tendency towards increased light interception and a significant decrease in yield.

OBJECTIVE

This experiment was designed to test the hypothesis that summer pruning could be used as a means of limiting vegetative growth in this dense hedgerow

PROCEDURES

During mid-July of 2000, two rows approximately 118 trees long were summer pruned with a mechanical hedger. Three other rows were left as unpruned controls. Four times during the summer of 2001, midday canopy light interception measurements were taken using an 80 cm Accupar light bar (Decagon Devices, Pullman, WA). One hundred measurements were taken in a grid pattern covering the area in the center of each plot at six different locations down each row (total of 600 measurements per row per day. The entire row was harvested by mechanical shaking and nut yield as well as nut quality factors were evaluated.

RESULTS

The seasonal pattern of midday canopy light interception is shown in Figure 1. As expected the light interception increased as the season went on in all treatments. However, even though looking down the row it appeared that the hedgerow was more open in the summer pruned rows, there was no significant difference between the summer pruned and non-summer pruned treatments. If anything, there was a tendency toward higher light interception in the summer pruned row suggesting that there may have been some stimulation of non-productive vegetative growth in the season following the summer pruning. Summer pruning led to a significant yield decrease of approximately 9% compared to the non-summer pruned control (Figure 1).

Although the common wisdom is that summer pruning tends to decrease vegetative vigor, this experiment does not support that point of view. The light interception measurements suggest that although there was no significant change in canopy light interception with summer pruning, if anything there was a tendency towards increased rather than decreased interception suggesting
increased vegetative growth (Figure 1). In fact, there are data from apples, pears and peaches suggesting that although summer pruning does lead to decreased growth as measured by trunk diameter, branch diameter, or root growth, it actually leads to an increased flush of vegetative growth the following summer. Since this vegetative growth is what causes problems in dense plantings, summer pruning can tend to exacerbate these problems.

These data agree with unpublished data collected by Ramos in 1977-78 on a 3 year old Chico hedgerow planted at an 11’ x 22’ tree spacing. In this study, individual vigorous shoots that had grown 3’ to 4’ past the nuts in response to the previous winters dormant hedging were used for a summer pruning experiment. These shoots were cut one foot past the nuts on July 7, 1977, July 21, 1977 or August 4, 1977 or were left uncut. Then on April 4, 1978, lateral bud break and fruitfulness were determined by counting the number of fruitful and non-fruitful laterals on the previous years growth on each tagged shoot. The shoots that were summer pruned did not have as much total growth as the unpruned control in the season of pruning (Table 1). In addition, the total number of laterals produced was less and the proportion of the laterals that were fruitful was also less (Table 1). The experiment did not follow the vegetative growth in the year following the summer pruning treatments so it is unclear whether or not there was a stimulation of vegetative growth in the year following summer pruning.

Table 1. Total shoot growth and number of fruitful and non-fruitful laterals produced in the following year response to summer pruning on various dates. Data from unpublished work by Dave Ramos.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unpruned control</td>
<td>124.6 a</td>
<td>12.5 a</td>
<td>0.3 b</td>
</tr>
<tr>
<td>July 7</td>
<td>76.6 b</td>
<td>6.8 b</td>
<td>1.6 ab</td>
</tr>
<tr>
<td>July 21</td>
<td>78.5 b</td>
<td>7.5 b</td>
<td>2.2 a</td>
</tr>
<tr>
<td>August 4</td>
<td>54.1 c</td>
<td>4.0 c</td>
<td>0.9 ab</td>
</tr>
</tbody>
</table>

Figure 1. Seasonal patterns of canopy light interception over the season for summer pruned and non-summer pruned rows (hedged the winter of 1999-2000) as well as rows hedged in the winter of 2000-2001.