New Zealand Experiences - Martinborough Vineyard

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History
In 1986 I joined Martinborough Vineyard as winemaker. The aim was to produce 7,000 cases of Pinot Noir and Chardonnay of the highest quality. The existing vineyards were planted on a 3 m row spacing at 1.5 m plant spacing giving 2,200 vines per hectare.

In the first three years while the plants were establishing roots, canopy vigour was not high, and the entire season’s growth could be placed on the standard upright trellis configuration adopted. Most importantly, fruitfulness was high. As the vines became further established three things happened:

• canopies became dense and canes became so long that they required mid season trimming;
• more importantly, overall fruitfulness of vines did not increase to expected levels and individual bud fruitfulness decreased;
• incidence of botrytis damage to ripening fruit greatly increased.

It was apparent that more buds needed to be laid down to generate more bunches and hence better yield-to-pruning ratios. The most obvious way to achieve this on a single wire trellis was by overlapping the canes from adjoining plants. This overlapping resulted in even more crowding of the canopy with the problems outlined above becoming more pronounced. For vigorous canopy such as Sauvignon Blanc the fruit produced was shaded, green in colour and intensely herbaceous to taste. The resulting wine was herbaceous to a fault. The few bunches exposed to direct sunlight were much more golden in colour, less herbaceous and had desirably higher Brix levels. For the less vigorous canopy producers such as Pinot Noir and Riesling, the effect was less pronounced.

It was clear that if more buds were needed within the limitation imposed by the existing wide row spacing, then the aim would be to train the canopy to avoid crowding. The goal adopted was to have every leaf and bunch exposed to direct sunlight. The results desired were:

• uniformly fruitful buds.
• minimum diseased bunches.
• ripper, more flavoursome fruit with better acid/pH balance.

Four ideas on trellis design were progressively introduced.

1. V-frame introduced for a row each of Sauvignon Blanc, Gewurztraminer and Chardonnay. And following the work produced by Richard Smart:
2. Scott Henry, which effectively doubled the utilised trellis area from 4,000m² per hectare to about 7,330m² per hectare.
3. Te Kauwhata Two Tier, which produced the same increase in utilised trellis area.
4. A modification of the V-frame to a U-frame.

The belief was the resulting juice would:

• have thicker skins and better colour and texture in the case of Pinot Noir
• have better flavours: ripper flavours, less herbaceousness.

The vines should:

• ripen earlier
• show less botrytis incidence requiring less fungal control management—important in New Zealand.
• produce higher yields—not necessarily desirable
• minimize extra canopy management tasks such as leaf plucking and trimming.

What has been achieved from these designs?

Scott Henry
Scott Henry has by far been the most successful canopy training method, with marked reductions in the need to summer prune, with increased yield per plant and hence per hectare (Table 1). An added bonus was the easier management of a relatively high ‘double-track’ bunch line which could be leaf plucked to allow good exposure to sunlight and free air movement with demonstrably better fruit. For example, the Chardonnay berries are golden instead of green in colour, with flavours into ripe stone-fruit rather than herbaceous.

Following the success of the Scott Henry system in the old wide row spacing vineyards, the system was used to establish a further 6 hectares in 1989/90. To further maximize the trellis area per hectare and to maintain exposure to sunlight within the rows, the new vineyard was established at 2.2 × 2.2 × 2 m.

This planting design achieved:

• more trellis per hectare with much the same number of plants.
• a grid pattern.
• taller posts to allow inherent vigour to be expressed and therefore utilised.

The increased trellis per hectare gives:

• Buds, leaves and fruit more evenly spread over the vineyard

Table 1. Pinot noir

<table>
<thead>
<tr>
<th>Trellis design</th>
<th>Brix</th>
<th>pH</th>
<th>Acid (g/L(TA))</th>
<th>Yield (kg/vine)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990 Standard</td>
<td>21.3</td>
<td>3.51</td>
<td>8.4</td>
<td>3.1</td>
</tr>
<tr>
<td>Scott Henry</td>
<td>22.5</td>
<td>3.56</td>
<td>7.9</td>
<td>2.7</td>
</tr>
<tr>
<td>1991 Standard</td>
<td>23.6</td>
<td>3.35</td>
<td>9.7</td>
<td>3.8</td>
</tr>
<tr>
<td>Scott Henry</td>
<td>24.2</td>
<td>3.44</td>
<td>6.9</td>
<td>6.5</td>
</tr>
<tr>
<td>1992 Standard</td>
<td>23.3</td>
<td>3.20</td>
<td>9.2</td>
<td>3.3</td>
</tr>
<tr>
<td>Scott Henry</td>
<td>23.6</td>
<td>3.18</td>
<td>8.8</td>
<td>3.5</td>
</tr>
<tr>
<td>1993 Standard</td>
<td>23.0</td>
<td>3.42</td>
<td>9.2</td>
<td>2.6</td>
</tr>
<tr>
<td>Scott Henry</td>
<td>23.4</td>
<td>3.34</td>
<td>10.0</td>
<td>2.9</td>
</tr>
</tbody>
</table>
Concerns with top versus bottom fruiting zones. When the one year longer to establish the top tier, with 2 fruiting zones commitment to spur pruning taken into account:

- No overlapping of canes. In fact it has taken a year longer for some vines to fill the wire properly. On some plants the internodes have been reduced enough to allow the desired number of buds to be laid and still leave a gap between plants on the fruiting wire. Utilisation of the inherent vigour of the site and therefore better yield to pruning weight balance.

All these factors have given riper fruit, better acid/pH balance, deeper colour and, overall, better yield per vine. Pinot Noir flavours and colours are much richer, moving from the strawberry characters to plum or berry flavours with better structure and lower, softer acids at lower pH level.

Te Kauwhata Two Tier trellis

The Te Kauwhata Two Tier (TK2T) system has given quality fruit, but with the following considerations needed to be taken into account:

- commitment to spur pruning
- one year longer to establish the top tier, with 2 fruiting zones to manage.
- concerns with top versus bottom fruiting zones. When the two areas have been picked separately the following comparisons resulted.

Table 2. Comparison of TK2T bottom and top fruiting zones

<table>
<thead>
<tr>
<th>Year</th>
<th>Variety</th>
<th>Brix</th>
<th>pH</th>
<th>Acid (g/L(TA))</th>
<th>Yield (kg/vine)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>Chardonnay - Bottom</td>
<td>22.7</td>
<td>3.46</td>
<td>7.4</td>
<td>2.9</td>
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<tr>
<td></td>
<td>- Top</td>
<td>21.5</td>
<td>3.42</td>
<td>7.1</td>
<td>3.3</td>
</tr>
<tr>
<td>1994</td>
<td>Chardonnay - Bottom</td>
<td>23.9</td>
<td>3.34</td>
<td>10.9</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>- Top</td>
<td>24.1</td>
<td>3.35</td>
<td>10.8</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Generally TK2T gives good exposure of fruit with thin, uncrowded canopies for maximum sunlight interception. It is more straightforward to manage than Scott Henry, gives similar results and is easily adapted to mechanisation.

V- and U-frame trellises

The original V-frame rows usefully split the canopy. However, no improvement in fruit quality was gained, mainly because the fruit was not well exposed to sun or air movement and the bunch line was crowded at the base of the V. The conversion to U-frame allowed clear separation of the canopy and a lower bunch line but no better exposure of fruit to sunlight and hence no amelioration of herbaceous flavours. The U-frame rows of Sauvignon Blanc are currently being converted to GDC.

Martinborough Vineyard aims to achieve super ripe, low malic acid levels with tropical melon flavours from the well exposed GDC fruit.

Conclusions

During the establishment of these trellises all canopies were assessed annually using the M K IV vineyard score card (Smart and Robinson 1991). After a number of years this gave the ability to fully assess the quality of a canopy at a glance.

With small-lot winemaking in Pinot Noir and Chardonnay and barrique ageing, many wines can be kept separate for assessment throughout the year prior to blending and bottling.

With a clear understanding of the desired flavours and styles, canopy management and manipulation is an ongoing process at Martinborough Vineyard.

Reference


Table 3. Comparison of the standard and the U-trellis, 1988 Sauvignon Blanc

<table>
<thead>
<tr>
<th>Trellis design</th>
<th>Brix</th>
<th>pH</th>
<th>Acid (g/L(TA))</th>
<th>Yield (kg/vine)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>23.1</td>
<td>3.4</td>
<td>6.7</td>
<td>5.9</td>
</tr>
<tr>
<td>U-frame</td>
<td>22.5</td>
<td>3.3</td>
<td>8.0</td>
<td>5.0</td>
</tr>
</tbody>
</table>

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References