EFFECT OF FLOWER THINNING, GIRDLING AND GIBBERELLIC ACID ON FRUIT QUALITY OF PERLETTE GRAPES

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ABSTRACT

The effect of flower thinning, flower thinning plus girdling and flower thinning plus girdling and gibberellic acid on fruit quality of Perlette grapes was studied during 1995 at Punjab Agricultural University, Ludhiana. Highest berry weight (3.29 g) was recorded in the treatment of flower thinning followed by girdling and two dippings in 40 ppm GA₃. Flower thinning followed by single dip in 40 ppm GA₃ and girdling recorded the highest total soluble solids (20.6%) and lowest juice acidity (0.48%). Cluster weight as well as fruit yield per vine were not significantly affected by any treatment.

PERLETTE occupies more than 95 per cent of grape area (2250 ha) in Punjab. It has been got many desirable characters like heavy bearing, early ripening and seedlessness. This variety is also easy to manage, prune and train. However, it does have some drawbacks like excessive fruit set, compact clusters, small irregular berry size, low TSS and high juice acidity when crop is not regulated.

A number of studies have been undertaken to improve the quality of perlette grapes. Gibberellic acid application (Cheema et al., 1985), cluster and berry thinning (Dhillon et al., 1988) and use of ethephon (Cheema et al., 1991) were reported to be helpful in this aspect. The present studies were therefore, initiated to combine all these earlier useful treatments on the same vines, so as to further improve the berry size and quality of perlette grapes.

MATERIALS AND METHODS

The experiment was carried out during 1995 in the College Orchard of the Punjab Agricultural University, Ludhiana. Ten year old vines of Perlette trained
on telephone and planted at distance of $3 \times 3$ m were used in the experiment. The vines were given uniform cultural practices as per the recommendations of the Punjab Agricultural University, Ludhiana during the course of studies. The following treatments were applied:

- **$T_0$** — Control
- **$T_1$** — Flower thinning
- **$T_2$** — Flower thinning + girdling
- **$T_3$** — Flower thinning + GA$_{(i)}$
- **$T_4$** — Flower thinning + GA$_{(i)}$ + GA$_{(ii)}$
- **$T_5$** — Flower thinning + GA$_{(i)}$ + Girdling + GA$_{(ii)}$
- **$T_6$** — Flower thinning + GA$_{(i)}$ + Girdling

Flower thinning was done with a plastic brush one week before flowering leaving 100-125 flower buds per cluster. Clusters were dipped in 40ppm GA$_3$ (GA$_{(i)}$) solution when berry size was 4 mm. This was followed by stem girdling by removing 4-5 mm wide ring of bark. Second 40 ppm GA$_3$ (GA$_{(ii)}$) dip was given six days after GA$_{(i)}$.

The fruit from the telephone trained vines was harvested on 15th June. The same treatments were also repeated on bower trained grapevines and the fruit was harvested on 2nd June 1995. Data on physico-chemical parameters were recorded as per the standard procedures (A.O.A.C., 1980).

RESULTS AND DISCUSSION

Fruit yield

Fruit yield of vines on both the training systems viz, telephone and bower was at par with each other and the differences in fruit yield due to various treatments were statistically non-significant. However, the highest fruit yield of 9.01 kg in telephone trained vines and 20.0 kg in bower trained vines was recorded in the treatment of flower thinning followed by cluster dipping in 40 ppm GA$_3$. Dhillon et al. (1988) reported significant reduction in fruit yield by berry thinning but in these studies the loss in berry number seems to be well compensated by increased berry weight with gibberellic acid and stem girdling. The vines trained on bower in general recorded higher fruit yield as compared to telephone trained vines. This may be due to more space for vine spreading on bower.

Bunch weight

Bunch weight was not effected much by any of the treatments and differences.
in bunch weight were statistically non-significant. However, highest bunch weight (352 g) in case of telephone trained vines was recorded in the treatment where flower bud thinning was followed by stem girdling and two dippings in 40 ppm gibberellic acid. The loss in bunch weight due to flower bud thinning may have been compensated by increased berry weight by gibberellic acid and stem girdling. Similar observation were also reported by Vij et al. (1973) in Khalili cv. of grapes.

Berry weight

All the treatments recorded significantly higher berry weight than the control, both in case of telephone trained vines (Table 1) as well as those trained to bower (Table 2). However, the highest berry weight (3.29 g) in case of telephone trained vines was observed in the treatment of flower thinning followed by two dips in 40 ppm GA3 and stem girdling. The same treatment resulted in highest berry weight (3.00 g) in case of bower trained vines. This may be due to the combined effect of flower thinning as reported by Dhillon et al. (1988) and due to berry sizing effect of gibberellic acid (Cheema et al., 1985) and girdling (Winkler et al., 1974).

Table 1. Effect of flower thinning, GA3 application and Stem girdling on fruit quality in grapes cv. perlette (Telephone Trained Vines)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield/Vine (kg)</th>
<th>Bunch wt. (g)</th>
<th>Berry wt. (g)</th>
<th>TSS (%)</th>
<th>Acidity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T0 Control</td>
<td>8.75</td>
<td>322</td>
<td>1.46</td>
<td>16.2</td>
<td>0.63</td>
</tr>
<tr>
<td>T1 Flower thinning</td>
<td>7.42</td>
<td>276</td>
<td>2.10</td>
<td>19.2</td>
<td>0.52</td>
</tr>
<tr>
<td>T2 Flower thinning + Girdling</td>
<td>7.92</td>
<td>317</td>
<td>2.64</td>
<td>20.0</td>
<td>0.52</td>
</tr>
<tr>
<td>T3 Flower thinning + GA (i)</td>
<td>9.01</td>
<td>322</td>
<td>2.82</td>
<td>18.7</td>
<td>0.62</td>
</tr>
<tr>
<td>T4 Flower thinning + GA (i) + GA (ii)</td>
<td>7.82</td>
<td>313</td>
<td>3.00</td>
<td>18.2</td>
<td>0.62</td>
</tr>
<tr>
<td>T5 Flower thinning + GA (i) + GA (ii) + Girdling</td>
<td>8.10</td>
<td>352</td>
<td>3.29</td>
<td>20.4</td>
<td>0.52</td>
</tr>
<tr>
<td>T6 Flower thinning + GA (i) + Girdling</td>
<td>9.00</td>
<td>283</td>
<td>3.10</td>
<td>20.6</td>
<td>0.48</td>
</tr>
</tbody>
</table>

LSD (P=0.05) N.S. N.S. 0.35 0.89 0.02

NS = Non-significant

Total soluble solids

There was significant improvement in total soluble solids due to various treatments over the control. The highest TSS (20.6%) was recorded in the treat-
Table 2. Effect of Flower thinning, GAs application and Stem girdling on fruit quality in grapes cv. perlette (Bower Trained Vines)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield/Vine (kg)</th>
<th>Bunch wt. (g)</th>
<th>Berry wt. (g)</th>
<th>TSS (%)</th>
<th>Acidity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T₀ Control</td>
<td>19.3</td>
<td>322</td>
<td>1.40</td>
<td>14.8</td>
<td>1.00</td>
</tr>
<tr>
<td>T₁ Flower thinning</td>
<td>18.8</td>
<td>304</td>
<td>2.00</td>
<td>17.0</td>
<td>0.60</td>
</tr>
<tr>
<td>T₂ Flower thinning + Girdling</td>
<td>18.5</td>
<td>309</td>
<td>2.64</td>
<td>17.4</td>
<td>0.56</td>
</tr>
<tr>
<td>T₃ Flower thinning + GA (i)</td>
<td>20.0</td>
<td>340</td>
<td>2.75</td>
<td>15.6</td>
<td>0.67</td>
</tr>
<tr>
<td>T₄ Flower thinning + GA (i) + GA (ii)</td>
<td>18.7</td>
<td>311</td>
<td>2.95</td>
<td>15.8</td>
<td>0.78</td>
</tr>
<tr>
<td>T₅ Flower thinning + GA (i) + GA (ii) + Girdling</td>
<td>18.8</td>
<td>313</td>
<td>3.00</td>
<td>16.8</td>
<td>0.60</td>
</tr>
<tr>
<td>T₆ Flower thinning + GA (i) + Girdling</td>
<td>19.3</td>
<td>322</td>
<td>2.85</td>
<td>16.6</td>
<td>0.62</td>
</tr>
</tbody>
</table>

LSD (P=0.05) N.S. N.S. 0.34 0.85 0.24

NS=Non-significant

ment of flower thinning followed by one dip in 40 ppm GA₃ and stem girdling in the case of telephone trained vines while in bower trained vines the highest TSS (17.4%) was recorded in the treatment of flower thinning followed by stem girdling. This may be due to lesser number of berries per bunch with flower thinning as reported by Dhillon et al. (1988) and girdling which created a barrier in the downward movement of photosynthates to roots resulting in increased T.S.S. in berries (Winkler et al., 1974). The differences in T.S.S. in fruit under different training systems (Tables 1 and 2) may be due to differences in time of harvesting as the experiment on bower was harvested on 2.6.1995 while that on telephone was harvested on 15.6.1995.

Juice acidity

All the treatments recorded significantly lower juice acidity than the control in the experiment on telephone trained vines. The lowest juice acidity (0.48%) was recorded in the treatment of flower thinning followed by one dip in 40 ppm GA₃ and stem girdling. In case of vines trained on bower the lowest juice acidity (0.56%) was recorded in the treatment of flower thinning followed by girdling. In the experiment on telephone all the treatments, except flower thinning followed by one and two dipping in 40 ppm GA₃, and in the experiment on bower all the treatments, recorded significantly lower juice acidity than the control. Similar observation have already been reported by Cheema et al. (1985).
LITERATURE CITED


