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Modern methods boost apple production in a South-West orchard

By N. H. SHORTER, B.Sc. (Agric.), Horticultural Adviser, Bunbury

A WELL-KNOWN South-West apple orchard with an impressive cropping record is owned by W. F. & E. M. Dilley and Sons, of Upper Capel, near Donnybrook. Trees in this orchard have been producing consistently heavy crops for many years and, furthermore, yields have increased steadily over a 10-year period.

The results obtained in Mr. Dilley's orchard are a reflection of the high standard of general orchard management, of the careful attention paid to irrigation and of the modern methods practised by Mr. Dilley and his sons in recent years.

Most notable of the newer methods adopted in this orchard are the use of chemical thinning sprays and a pruning system based on a minimum of cutting and the development of laterals. Both aspects are discussed below.

10-Year Cropping Records

Mr. Dilley has kept an accurate record of cropping for the 10 years 1954-1964. The figures have been kindly made available and are:

<table>
<thead>
<tr>
<th>Year</th>
<th>Yield (Bushels packed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1954-55</td>
<td>4,579</td>
</tr>
<tr>
<td>1955-56</td>
<td>8,653</td>
</tr>
<tr>
<td>1956-57</td>
<td>5,798</td>
</tr>
<tr>
<td>1957-58</td>
<td>7,457</td>
</tr>
<tr>
<td>1958-59</td>
<td>9,934</td>
</tr>
<tr>
<td>1959-60</td>
<td>10,665</td>
</tr>
<tr>
<td>1960-61</td>
<td>8,551</td>
</tr>
<tr>
<td>1961-62</td>
<td>10,286</td>
</tr>
<tr>
<td>1962-63</td>
<td>10,500</td>
</tr>
<tr>
<td>1963-64</td>
<td>10,756</td>
</tr>
</tbody>
</table>

As the total output each year refers to both apples and pears, it should be noted that up to 1960 the annual yield included about 200 bushels of pears; since then this figure has increased to about 300 bushels.

The record crop in 1959-60 was obtained in a year when crops were very poor in most parts of the State.

Throughout the 10-year period, the number of bearing apple trees in Mr. Dilley's orchard was 1,385 of which 805 were Granny Smiths, 305 Delicious, 200 Golden Delicious with 50 Yates and 25 Statesman.

Some younger trees are now starting to crop, but up to 1963-64 contributed very little to the overall yield. In 1963-64 these trees produced 500 of the total of 10,756 bushels.

For the four years up to 1958, the annual average yield of apples packed was 4.6 bushels per tree. For the following six years the average rose to 7.0 bushels per tree.

Of the 1,385 bearing trees 700 were 17 to 18 years old in 1964. These trees were therefore seven to eight years old at the start of the 10-year period.

The oldest trees in the orchard were 200 trees Mr. Dilley planted in 1929; these were 35 years old in 1964.

The remaining 500 trees were mainly planted between 1935 and 1938. These trees were therefore between 16 and 19
years of age at the start of the 10-year period.

All trees are grown on Northern Spy stock and with adequate provision for cross pollination commence cropping at an early age.

**Chemical Thinning**

Mr. Dilley's orchard is the first orchard in Western Australia where chemical thinning sprays were adopted as commercial practice for apple trees.

Chemical thinning sprays on a trial basis were first applied in 1956. In that year, NAA, now better known as Phyomone, Shellestone or Lanes NAA, was applied as a petal fall spray to Yates, Delicious and Golden Delicious. Half the trees of each variety were treated. Following success in the first year, chemical thinning was continued the following year with Yates and Golden Delicious and "on" year Delicious, and again in 1958 on all the main varieties, including Granny Smiths.

Since 1958, chemical thinning has become standard practice in Mr. Dilley's orchard. Sprays are applied selectively to varieties according to requirements.

Some overthinning was experienced in 1961, but the crop was still a very good one. The slight crop loss that year has been more than compensated by the benefits over several years.

**Delicious Flowering Every Year**

With Delicious, chemical thinning combined with lateral pruning has considerably reduced the acute biennial bearing habit of this variety. Although blossoming in the "off year" is still much lighter than in an "on year" trees are flowering every year. "Off year" blossom is usually sufficient to set a worthwhile crop and adequate for cross pollination of nearly all Granny Smith trees. These results have only been maintained by spraying very thoroughly in the "on" year.

Mr. Dilley has generally found NAA at the late petal fall stage to be adequate for Delicious, but intends also to experiment with Sevin for this variety. NAA is used at normal strength with white oil or Tween 20.

Sprays are not applied in the "off" year.

**Outstanding Success with Yates**

Outstanding success has been achieved in thinning the Yates variety. Sprays have been necessary in most seasons and successful only if applied as a fairly complete cover. In a normal year Mr. Dilley favours a concentration of 15 parts per million, which is 1 1/2 times normal strength. White oil or Tween 20 is added and the spray applied at late petal fall.

**Treatment to Granny Smiths**

Granny Smiths spraying has been mainly confined to the top parts of the
trees. The thinning requirements for the Granny Smith variety are, however, not as high as in non-irrigated orchards.

In some seasons, more trees receive attention than in others. Mr. Dilley is guided here by the appearance of the blossom and early fruitlets.

Sprays are applied from late petal fall to the early calyx stage.

The mixture generally used for Granny Smiths is NAA at normal strength, with white oil. Mr. Dilley, so far, has not found it necessary to use Amid-thin, the material which is now tending to replace NAA as a late petal fall spray for this variety.

Mr. Dilley feels that Sevin also has a place as a thinning spray for Granny Smiths. This material is a moderate thinner for this variety when applied 10 to 14 days after petal fall. Excellent results were obtained in a trial carried out by the Department of Agriculture in cooperation with Mr. Dilley in the 1961-62 season.

Golden Delicious

Very satisfactory results have been obtained with thinning sprays for the Golden Delicious variety.

The mixture favoured is NAA at normal strength with white oil or Tween 20.

Sprays have usually been applied as a fairly complete cover at the late petal fall stage.

With chemical thinning, the Golden Delicious trees have been blossoming and cropping every year. Sprays have been found necessary in most seasons.

Lateral Pruning

Pruning in Mr. Dilley's orchard has, for many years now, been based on a minimum of cutting and the development of a system where a large part of the crop is carried on laterals.

With Granny Smiths, Golden Delicious and Yates, fully grown trees are very often left completely unpruned for three or four years. Pruning then consists mainly of light pruning of laterals. Mr. Dilley explains that the main reasons why he considers pruning is sometimes necessary with these three varieties is first, to allow enough light into the trees, second, to prevent overcrowding of fruiting wood and therefore avoid excessive limb rub, and third, to develop a system where some new laterals are produced. Young trees receive more regular attention.

Special attention is paid to Delicious. With this variety, Mr. Dilley has developed a system where most of the fruit is again carried on laterals, some of which are, however, cut back and replaced every year.

The first three years of a change-over to lateral fruiting have been found to be most important with Delicious. During this period, trees have to be converted from a system where most of the fruit is carried on spurs to a system where the main crop is borne on laterals. The method followed by Mr. Dilley is to shorten back or remove up to 60 per cent. of the new laterals produced from previous hard cutting. The remaining laterals are left completely unpruned. The following year,
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Careful attention is paid to cross pollination. Varieties are well spaced. Beehives are placed in the orchard at flowering time. This hive is placed in an area from which a block of stonefruit have been removed.

many of the two-year-old laterals are again left unpruned. A system is soon established where the main crop is carried on two and three-year-old lateral wood with the older wood being continuously replaced by new wood. With chemical thinning a proportion of the lateral buds will flower every year.

Once the system has been established for the Delicious variety, the practice is much the same as with the other varieties, except that the thinning-out of the lateral fruiting system is carried out annually. Some of the older laterals are cut back to new wood or removed completely. Overcrowding of laterals is avoided as far as possible. Strong “water” shoots, especially those growing inside the tree, are normally removed. The amount of pruning wood removed from a tree at any one time will depend on the vigour of the trees. Moderately vigorous trees are pruned rather more heavily than less vigorous trees or trees making very vigorous growth.

By encouraging the development of laterals, Mr. Dilley has been able to avoid the removal of much valuable fruiting wood. When this type of system is combined with chemical thinning it is possible to benefit from increased production without sacrificing fruit size or quality. This applies to all varieties.

Cross Pollination

Varieties are well spaced and provide excellent provision for cross pollination. Four rows of Granny Smiths are generally interspersed with two or four rows of a pollinating variety.

As an added provision to aid effective cross pollination five or six beehives are placed in the orchard at flowering time. Cross pollination in the orchard is also aided by the fact that trees rarely seem to suffer from delayed flowering, although Golden Delicious are inclined to blossom a little late in some years.

Irrigation and General Management

Irrigation is undoubtedly a most important factor in Mr. Dilley’s orchard.
The main benefits obtained from irrigation are:

- Tree health has been safeguarded;
- It allows full advantage to be taken of chemical thinning and light pruning.

The orchard has been irrigated since 1954.

The usual programme is from two to five good waterings, the number depending on the season. Mr. Dilley aims for deep penetration at each watering.

A portable sprinkler system is used, and water is supplied by a 22-million gallon gully dam near the orchard.

The fertiliser programme over the years has consisted mainly of mixed fertiliser, supplemented by cover crops. Mr. Dilley personally favours an annual dressing of an organic fertiliser such as blood and bone around August. In addition, the orchard receives a light dressing of superphosphate in the autumn and a light dressing of a nitrogen fertiliser such as C.A.N. or Urea in October.

Drainage is good, being well served by underground tile drains.

Thrips have been a problem in some seasons and Mr. Dilley now applies at least one DDT spray during the flowering period.

The spray programme for the year has also usually included a spray of winter superior oil with lime sulphur, applied around the first week of September. Any trees expected to flower late are also sprayed with winter oil in early August.

Early adoption of modern methods of fruit growing has brought outstanding results on this South-West apple orchard. Irrigation, chemical thinning and lateral pruning combine to help produce regular heavy crops.

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