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Delayed foliation in apple trees

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DELAYED foliation refers to the late leafing out and production of small leaves by fruit trees.

However, the weak and protracted blossoming which precedes the appearance of the leaves has more serious consequences for it may lead to a reduced set of fruit. Delayed foliation follows mild winters, which do not provide sufficient chilling for deciduous fruit trees. Mild winters occur occasionally in Western Australia and affect the blossoming of apples, pears and some varieties of stone fruit. This means that an orchardist moving among his trees in winter to assess their condition should also be watching and judging winter weather conditions.

It has been said that delayed foliation is caused by mild winters, but this is an oversimplification since temperature is not the only factor involved. Sunshine is detrimental in that it raises the temperature of the buds above that of the surrounding air.

Cold cloudy weather is the ideal for deciduous fruit trees; frosty nights followed by clear sunny days are of doubtful benefit.
The adverse effects of delayed foliation can be greatly reduced by spraying with D.N.C. winter oil early in August. If this is not available the following mixture may be used:

- 2 pints of the sodium salt of D.N.C.
- 3 gallons superior oil.
- 100 gallons water.

In adverse seasons such as 1959-60 the control of delayed foliation can raise the crop carried by the trees to something approaching the normal level. The economic benefit is therefore simply one of ensuring a reasonable crop.

The phenomenon of delayed foliation was described in greater detail in an article by Melville and Hardisty, who did the early trials with D.N.C. Results of this work were published in the May-June 1955 issue of this Journal.

**EXPERIMENTAL AIMS**

The experiment to be described was designed to determine the advantages, if any, of spraying with D.N.C. every winter as compared with spraying only after very mild winters. Both these treatments were compared with the routine treatment, namely, spraying with superior oil.

The work was conducted over a period of five years to cover as many types of winter weather as possible. As in fact the winters of 1956, 57, 58, 59 and 60 included a range of weather from very mild to very cold, an indication was obtained of the conditions under which corrective treatment is necessary.

**METHOD**

The variety used was the Granny Smith, which is susceptible to delayed foliation.

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<tbody>
<tr>
<td>Sprayed with Superior Oil</td>
<td>153</td>
<td>242</td>
<td>169</td>
<td>82</td>
<td>345</td>
<td>992</td>
</tr>
<tr>
<td>Sprayed with D.N.C. only in 1959</td>
<td>161</td>
<td>231</td>
<td>159</td>
<td>201</td>
<td>317</td>
<td>1070</td>
</tr>
<tr>
<td>Sprayed with D.N.C. every year</td>
<td>155</td>
<td>218</td>
<td>230</td>
<td>82</td>
<td>352</td>
<td>1037</td>
</tr>
</tbody>
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FRUIT WEIGHTS FOLLOWING VARIOUS SPRAYS (POUNDS PER TREE)
Forty eight trees were included in the experiment which was carried out at Stoneville Research Station. All fruit harvested from the trees was weighed and a sample measured to give an indication of the benefits to be derived from the application of sprays to reduce delayed foliation.

RESULTS
The figures of average crop weights per tree in pounds per treatment and the graph summarise the results.

DISCUSSION
The last treatment in the table above, namely the application of D.N.C. in five successive years, produced an interesting if somewhat disappointing result.
In the normal winter of 1956 and the mild winter of 1957 no significant increase in crop was recorded.
However a mild winter in 1958, plus the fact that the trees were in an “off year”

Fruit diameter measurements showed no worthwhile differences. Crop weight is the important factor.
gave a significant increase only to be followed by a very light crop the following year. D.N.C. thus gave two "on year" crops in succession followed by a very light crop, due in fact to a low percentage of fruit buds.

Twenty per cent. of the buds on the D.N.C. sprayed trees were fruit buds in 1959 whereas the control trees which were in a normal bearing sequence, had 41 per cent. fruit buds.

From this treatment it can be suggested that the annual application of D.N.C. is of doubtful economic advantage and that it does not prevent biennial bearing.

Thinning sprays are the obvious answer. Conversely, if D.N.C. is applied only in very mild winters, that is, winters mild enough to greatly prolong blossoming and reduce the set of fruit, a normal crop will be produced. No amount of spray thinning the previous season nor any other measure can ensure this.

Spraying in 1959 during a very mild winter increased the set of fruit from 13 fruit per 100 blossom clusters to 54 fruit per 100 blossom clusters and the weight of crop from 82 pounds per tree to 201 pounds. As 1959 was an "on year" the light crop of the unsprayed trees was due entirely to weather conditions. Bearing in mind the relative shortage of apples on the markets and the reasonable export prices offered in 1959-60 as compared with the 1960-61 season a considerable economic advantage accrued from a single application of D.N.C. in 1959.

Therefore the decision whether or not to apply D.N.C. depends entirely on winter weather conditions.

Throughout these experiments D.N.C. was applied during the first week in August, since this gives maximum results. Later application will still give some benefit.

**SUMMARY AND RECOMMENDATION**

In the light of the above, a grower should evaluate the weather conditions experienced during the winter at the end of July and decide whether or not measures to correct delayed foliation are necessary. If in doubt he should consult his local Horticultural Adviser or Instructor.

He should bear in mind that:

- D.N.C. is not a means of correcting biennial bearing.
- It is best utilised only when winter conditions are mild enough to reduce setting of fruit, as they were in 1959.
- The effect of D.N.C. application on fruit size is negligible.
- It gives some control of San Jose Scale.
- It should be applied during the first week in August.
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