Latest recommendations for chemical thinning: an aid to apple crop regulation

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Latest Recommendations for . . .

CHEMICAL THINNING

By S. E. HARDISTY, B.Sc. (Agric.), and N. H. SHORTER, B.Sc. (Agric.)

Horticultural advisers S. E. Hardisty (Bridgetown) and N. H. Shorter (Bunbury) give the latest recommendations on chemical thinning in the apple orchard.

Some advantages of chemical thinning are—

- More uniform cropping
- Lower thinning and picking costs
- Fewer limb breakages
- Better tree health

FIELD trials and experience have shown that chemical thinning is a valuable aid to crop regulation in apple trees.

Since recommendations were first published in the October, 1960 issue of the Journal of Agriculture it has been adopted by many progressive apple growers, and tested in field experiments carried out by the Department of Agriculture. Experience gained has made it possible to give more precise recommendations on the use of thinning sprays, improving on those originally published.

These recommendations are given below and are summarised in the table at the end of the article.

The experiments on which recommendations are based are described in a separate article in this issue.

ADVANTAGES OF CHEMICAL THINNING

When apple trees are spray thinned, the young fruitlets are removed at a very early stage of development. This removes the stress on the trees, allowing subsequent improvement in growth of the remaining fruit.

Spray thinning also has a beneficial effect on bud development for the following year. This is not achieved with hand thinning, which removes the fruits at a much later stage.

The main benefits which follow chemical thinning are therefore more controlled cropping in a heavy setting year, and reduced thinning and picking costs in the orchard.
An aid to apple crop regulation

Other important associated benefits are:
- Fewer limb breakages.
- Fruit can be harvested at the best stage of maturity.
- Average yields are likely to improve.
- Tree health should improve over a number of years.

While chemical thinning is easily used and can be expected to give good results when used according to the recommendations it is not a simple process. Results vary according to variety, age of trees, conditions in the orchard, spray materials used, and spraying times and procedures.

These things must be carefully considered before spray thinning is carried out. Study of the following points, and close reference to the table at the end of this article should ensure successful thinning.

THE DEGREE OF THINNING
Thinning should aim for a high yield of commercially popular size fruit. The degree of thinning needed to achieve this in any particular orchard varies with the circumstances. For example, in non-irrigated orchards which depend greatly on unreliable summer rains to bring the fruit up to size, the need for thinning is considerably greater than it is on trees under irrigation.

Spray thinning should not be expected to eliminate the need for follow-up hand thinning, although it will greatly reduce it. Trees react differently to thinning sprays, according to vigour and growing conditions in different parts of the orchard, and if some hand thinning is not needed after spraying then it is almost certain that some trees have been over thinned.

Red varieties such as Yates, Jonathans and Delicious definitely need subsequent hand thinning, while Granny Smiths need little more than the removal of fruit from the tops of the leaders to avoid limb breakages.

A well thinned Granny Smith. The ideal to aim for is a good yield of commercially-popular sized fruit.
Heavy blossoming in an “on” year. Chemical thinning would be most effective in this case.

**ASSESSING THE DEGREE OF THINNING**

**Cropping behaviour** is the first consideration in determining thinning requirement, especially with the Granny Smith variety.

Trees that have developed an “on” year—“off” year cycle need more thinning than those with a more uniform cropping habit.

Older, non-irrigated trees also need fairly heavy thinning, and, as shown in the spray schedule should be given a more thorough spray than young trees or old trees growing under more favourable conditions.

**Strength of blossoming** and signs of the early fruit set are the best guides to the degree of thinning needed. Bud development is not a reliable guide.

**Local knowledge** of the trees’ ability to grow fruit up to size is also important. This is only gained from experience in the particular orchard.

**Thrips** can obviously affect the need for thinning. Their activity can be gauged from observation and seasonal conditions.

**FRUIT SIZE AND HARVESTING**

Chemical thinning tends to give a more even fruit size, which has the advantage of reducing the number of pickings needed to harvest the crop at the best size and maturity.

This is most important with the green varieties where the main complaints made by overseas buyers concern overmaturity and bruising. The earlier and more concentrated picking period which follows spray thinning reduces this problem.

Another advantage of earlier harvesting after spray thinning is that it helps the trees to produce a crop in the following “off” year.

**ALLEVIATION OF BIENNIAL BEARING**

Spray thinning helps promote regular cropping. However, seasonal growing conditions still have an important bearing on crop regularity because they control bud burst and fruit set in the spring and tree health and fruit size in the summer. This was demonstrated in a recent cycle of seasons: In 1961-62 crops on “off” year trees were poor after chemical thinning the year before. How quickly trees will be brought into regular cropping and whether it is maintained will depend on the efficiency of the chemical thinning treatment, and the seasonal conditions.

**CROSS POLLINATION IS IMPORTANT IN THE “OFF” YEAR**

Although a good fruit set is obtained on biennial bearing Granny Smith orchards in the “on” year with limited pollinators, crops in the “off” year following spray thinning are greatly increased when close to suitable cross-pollinators.

In seasons of delayed foliation and thrips attack, the early flowering varieties such as the Cleopatra and Jonathan are better than the later flowering Yates for cross pollinating the “off” year Granny Smith.
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Good return blossoming in the “off” year following chemical thinning. The treatment has reduced biennial bearing.

**PRUNING AND CHEMICAL THINNING**

Spray thinning can improve tree health by eliminating over-cropping and also by doing away with the need for heavy pruning.

In the past, detailed pruning followed by hand thinning was the normal practice. Lighter pruning and chemical thinning to produce good sized fruit is now known to help tree vigour and promote bigger crops.

It is suggested that mature trees which have in the past been heavily pruned should have little or no pruning for at least the next one or two years. The stress of heavy crops can be overcome by thinning sprays.

Pruning would be more beneficial when entering the “off” year and should only aim to thin out the fruiting systems.

**CHEMICAL THINNING MATERIALS**

The three main chemical thinning agents now available are Naphthalene acetic acid (NAA), Naphthalene acetamide (NAD), and Sevin.

**NAA:** Is a general purpose material for all varieties. It has the disadvantage of causing wilting of the foliage. This condition is usually only temporary.

NAD (sold commercially as Amid-thin	extsuperscript{*}): Has some advantages over NAA. At the recommended strength it causes less foliage wilting and more even thinning.

Time and rate of application of this material is the same as NAA. It is a good thinner for Granny Smith, but should not be used for Yates or Delicious.

**Sevin:** Was first developed as an insecticide. It is a useful thinning agent under some circumstances and is quite satisfactory where limited thinning of Granny Smiths and Jonathans is wanted. It is not recommended for the other varieties.

Sevin offers an excellent means of reducing fruit set on the tops of young trees as it has no effect on the foliage. Applied seven to 10 days later than the other sprays it gives an opportunity to reassess thinning requirements. In this way it can be used as a more complete spray where only a light spraying has been used earlier.

**WETTING AGENTS AND SURFACTANTS**

Wetting agents and “surfactants” are additives which, when used with the thinning sprays, greatly increase the activity of the hormones in the sprays.

*A product of Amchem Products Inc.*
Much time was spent on hand thinning this unsprayed Delicious tree. Chemical thinning would have saved most of this time as well as giving better control of cropping.

Wetting agents enable the foliage to be wetted quickly and efficiently without greatly increasing the absorption of the hormone.

Surfactants have the same wetting effect, but also increase the absorption of the hormone. The concentration of the active ingredient should be reduced when surfactants are used.

Tween 20 and (apparently) white oil act as surfactants. Tween 20 gives a more even rate of absorption through a wide range of conditions, by increasing uptake when conditions are unfavourable for absorption.

Increasing the quantity of these materials beyond the recommended levels may result in over-thinning.

**EQUIPMENT**

Hand spraying lances delivering a broad cone of the spray mixture with a fine droplet size are recommended. Nozzles which deliver a narrow jet of coarse droplets are not satisfactory.

Airblast machines have been used, but present a problem where a selection of different treatments and chemical strengths for different varieties, tree sizes and amount of blossoming is wanted.

As these machines are often used without calibration, twice normal strength should not be exceeded.

**TIME AND METHOD OF APPLICATION**

Amid-thin and NAA should be applied at late petal fall. There is a latitude of a few days after this stage, but spraying should be as near as possible to petal fall. Each variety should be treated separately as this stage is reached.

Earlier spraying near full bloom, and later spraying from the calyx stage onwards, may give inconsistent results.
In the case of Yates, which are harder to thin, spraying can be done to advantage a few days closer to full bloom.

Sevin should be applied about two to three weeks after full bloom. Timing does not seem to be so critical with this spray, but spraying after the three week period is not likely to be as effective as earlier spraying.

**APPLYING THE SPRAY**

Where heavy setting is expected, the top two-thirds of the tree should be thoroughly wetted.

If limited thinning is needed, spraying should be restricted to the upper parts of the tree, or only the tops.

A good practice when applying chemical thinners to the orchard is to vary the amount of spray according to the extent of thinning desired. An orchard should be treated selectively by spraying individual trees thoroughly or lightly according to their needs, or even not at all if a light setting is indicated.

When there is some uncertainty about the degree of thinning needed by Granny Smiths an early spraying of NAA or Amid-thin may be applied at petal fall to the tops of leaders. The position can be reassessed about 10 days later, and a more complete spray of Sevin applied if necessary.

Chemical thinners should not be mixed with insecticidal sprays.

**CONDITIONS WHICH AFFECT THE DEGREE OF THINNING**

The extent of thinning is related to the degree of absorption of the active ingredient. Where the spray dries slowly absorption is more complete and more thinning is likely to result.

This occurs during cool moist weather or when spraying is carried out in the late afternoon or evening.

The least thinning can be expected in warm, dry conditions where the spray dries quickly. Under these circumstances Tween 20 can assist uptake.

**RECOMMENDATIONS**

The recommendations in the table summarise the results of Departmental trials over a number of years.

Materials and concentrations are listed according to variety.

In the case of Granny Smiths, tree age and cropping behaviour are also considered.

The recommendations are intended only as a guide and may need to be adjusted according to each particular situation.

In a number of cases the range of Amid-thin is shown as 6 to 8 oz. per 100 gallons. The higher concentration should be used only where considerable thinning is needed.

IF IN DOUBT ABOUT THE BEST SCHEDULE TO ADOPT CONTACT YOUR LOCAL DEPARTMENT OF AGRICULTURE FIELD OFFICER.

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**MAKESHIFT TRACTOR STARTING DANGEROUS**

Farmers having difficulty starting their tractors on cold mornings should locate and rectify the trouble rather than employ makeshift starting methods.

The tractor operator's handbook should be consulted first, says the N.S.W. Department of Agriculture's Agricultural Engineer, J. G. Drever.

If the trouble persists, it may be necessary to call in the tractor dealer.

The safest temporary measure is to use another vehicle to tow the tractor around until it starts.

Mr. Drever warned that squirting petrol or other fuels into the air intake was dangerous.

Such practices could cause severe personal injury, as well as serious damage to the tractor.

Removing the air cleaner hose and holding burning, fuel-soaked cloths near the air intake while the starter is engaged is foolish.

Cases were known where this resulted in the tractor suddenly bursting into flames, said Mr. Drever.

Pouring hot water into a cold engine would probably crack the cylinder water jacket.
## CHEMICAL THINNING OF APPLES

### SPRAY RECOMMENDATIONS—1962

<table>
<thead>
<tr>
<th>VARIETY</th>
<th>SPRAY MIXTURE</th>
<th>REMARKS</th>
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| **GRANNY SMITHS**—  
(a) Older biennial bearing trees on non-irrigated sites and entering the “on” year | 1. 6 to 8 oz. Amid-thin + $ pint Tween 20 per 100 gals.  
2. 10 ppm NAA + wetting agent | The Amid-thin spray is preferred. The choice between 6 and 8 oz. depends on seasonal conditions. With favourable setting conditions 8 oz. can be used. |
| (b) Older irrigated trees and all younger trees | 1. 6 to 8 oz. Amid-thin + $ pint Tween 20 per 100 gals.  
2. 10 ppm NAA + wetting agent | Where the need for thinning is uncertain, the tops of the trees may be sprayed with 6 to 8 oz. Amid-thin + Tween 20 at petal fall. If considered necessary follow 10 days later with 1½ lb. Sevin (80%) applied as a more complete cover. |
| **CLEOPATRA**    | 1. 5 oz. Amid-thin + $ pint Tween 20 per 100 gals.  
2. 10 ppm NAA + wetting agent | This spray is preferred. Apply as a light spray to the tops. |
| **JONATHAN**     | 1. 6 to 8 oz. Amid-thin + $ pint Tween 20 per 100 gals.  
2. 1½ lb. Sevin (80%) per 100 gals. | The choice between 6 and 8 oz. depends on seasonal conditions. Use where less thinning is required. |
| **DELICIOUS**    | 1. 10 ppm NAA + $ pint Tween 20 per 100 gals. | If necessary Tween 20 may be replaced by 2 pints summer spraying oil. |
| **GOLDEN DELICIOUS** | 1. 6 to 8 oz. Amid-thin + $ pint Tween 20  
2. 10 ppm NAA + wetting agent | The choice between 6 and 8 oz. depends on seasonal conditions. |
| **YATES**        | 1. 10 ppm NAA + $ pint Tween 20 per 100 gals. | If necessary Tween 20 may be replaced by 2 pints summer spraying oil. Where very heavy setting is expected and trees are not irrigated, concentration of NAA can be increased up to 15 ppm. |
| **DOUGHERTY**   | 1. 10 ppm NAA + $ pint Tween 20 per 100 gals.  
2. 10 ppm NAA + wetting agent | Note ppm = parts per million. |

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