



# **Grower Summary**

# TF 197a

Continuation of previous work (TF 197) to determine the cost benefit of a range of thinning strategies for apple

Final 2013

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#### **Further information**

If you would like a copy of the full report, please email the HDC office (hdc@hdc.ahdb.org.uk), quoting your HDC number, alternatively contact the HDC at the address below.

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Project Number:	TF 197a
Project Title:	Continuation of previous work (TF 197) to determine the cost benefit of a range of thinning strategies for apple
Project Leader:	Gary Saunders
Contractor:	East Malling Research
Industry Representative:	Giles Cannon, GSR Fruits Ltd
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Project Cost:	£9,320

# Headline

• Depending on the season and the crop load, fruit thinning may not always lead to increased returns in apple orchards.

#### Background and expected deliverables

Tree fruit growers are keen to develop chemical and/or mechanical methods of fruit thinning to reduce reliance upon expensive hand thinning operations. Indeed the HDC Tree Fruit Panel considers this to be a high priority in its research strategy.

Apple trees often set excessive numbers of fruit in relation to tree size resulting in the production of large numbers of small fruit. Thinning or removing a proportion of these fruit enables the remaining fruit to reach a larger size, and these are easier and cheaper to pick. This enables growers to produce fruit in the desired size range for market requirements. In addition to increasing fruit size, thinning can also be carried out to increase fruit quality, for instance, when damaged fruit is removed from the tree. Thinning is also carried out to prevent over cropping, as in some varieties this can lead to biennial bearing.

There have been recent developments in both chemical and mechanical fruit thinning techniques. If effective, such developments could reduce or remove the cost of the hand thinning operation. This project investigated such alternative thinning techniques for Gala apple.

## Summary of the project and main conclusions

The treatments applied in 2011 were as follows:

- 1. Untreated
- 2. Hand thinning at 12-15 mm according to agronomists' recommendations
- 3. Exilis applied at 8-12 mm fruit size at 7.5 l/ha in a water volume of 500 l/ha, when temperature is forecasted to be above 15°C for the two days following application
- Ammonium thiosulphate (ATS) applied at open flower at a rate of 2% applied as 500 l/ha
- 5. ATS applied at open flower at a rate of 2% applied as 500 l/ha + Exilis applied at 8-12 mm fruit size at 7.5 l/ha, when temperature is forecasted to be above 15°C for the two days following application, in a water volume of 500 l/ha

- 6. Cerone (0.75 l/ha in a water volume of 500 l/ha) applied at petal fall
- Cerone (0.75 l/ha in a water volume of 500 l/ha) applied at petal fall + Exilis applied at 8-12 mm fruit size at 7.5 l/ha, when temperature is forecasted to be above 15°C for the two days following application, in a water volume of 500 l/ha
- 8. Mechanical blossom thinning using the Fruit-Tec Darwin thinner

The treatments applied in 2012 were as follows:

- 1. Untreated
- 2. Hand thinning to doubles per cluster at 12-15mm
- 3. Hand thin all small, under-developed fruit per cluster at 12-15mm
- Exilis applied at 8-12mm fruit size at 7.0 l/ha, in a water volume of 1000 l/ha with 0.5% Li-700, when temperature was forecasted to be above 15°C for the two days following application
- 5. Exilis applied at 8-12mm fruit size at 7.0 l/ha, with 0.175 l/ha Tipoff and 0.5% Li-700, when temperature was forecasted to be above 15°C for the two days following application, in a water volume of 1000 l/ha

Treatments applied in 2011 at bloom were ineffective at reducing crop load; however reports from growers suggest that ATS (ammonium thiosulphate) and the Darwin mechanical blossom thinner are feasible alternatives to hand thinning.

Post-blossom alternatives, such as Exilis (6-benzyladenine), to hand thinning, have been shown to be effective at reducing crop load. Exilis reduced crop load by 48% in 2011 and 19% in 2012, the difference between years being attributable to cooler temperatures immediately post application in 2012. It has also been shown that hand thinning can have little effect on fruit number at harvest if the level of thinning is insufficient for the crop load on the tree. In 2012, fruit was thinned to two fruit per cluster and this had no significant effect on fruit numbers at harvest, whereas in 2011 fruit was thinned to a single fruit per cluster and here the fruit number at harvest was significantly reduced.

In 2011 a greater thinning effect was observed than in 2012, and in 2011 it was shown that by reducing crop load, fruit size increased. There were greater returns for fruit in the larger

size classes, but the reduction in fruit number outweighed this increase in return per apple, resulting in a reduction in income per tree.

In 2012 there were no significant differences between the treatments and the un-thinned control for return per tree. However there was a difference between hand thinning all small fruit and the Exilis application, with a greater return achieved from the Exilis application. The Exilis application gave a greater proportion of larger fruit than the 'hand thinning small fruit' treatment, where a greater price was achieved for the larger fruit. In addition to this, the thinning cost for the Exilis application was less per tree than the cost of hand thinning the small fruit.

Applications of Exilis in 2011 showed no adverse effects on return bloom compared to the control.

Before drawing any major conclusions from this trial, it should be remembered that it was only carried out over a two-year period and that in the second year of the project, fruit set was poor due to the wet spring conditions.

#### Conclusions from this work

- 1. Alternatives to conventional hand thinning exist.
- 2. Thinning clusters to two fruit may not reduce the number of fruit at harvest compared to an un-thinned crop.\*
- 3. Thinning a crop may not result in the greatest potential profit.\*\*
- 4. Careful consideration is required when making decisions on thinning.

\*This was for data from a year where there was a very poor fruit set due to wet weather conditions in spring.

\*\* Thinning may have benefits on preventing biennial cropping and increasing brix levels.

#### **Financial benefits**

Reducing crop load and increasing fruit size may not necessarily lead to an increased return. In 2011 the lowest return per tree was achieved from the greatest thinning effect, ATS + Exilis (£12.33), whereas the un-thinned treatment returned £18.68 per tree. This is of course information for one year from one orchard. In 2012 there was no significant effect on financial return for any of the treatments compared to the control. In 2012, hand thinning fruit to doubles per cluster did not significantly reduce fruit number compared to the control, nor was there a significant change in return per tree. However, the effect of carrying out this exercise would be to spend more money producing the crop which, although it would be recouped on the sale of the crop, would have an impact on cash flow during the growing season.

## Action points for growers

- Decisions on the level of thinning required need to be based on initial crop load, and potential return for each size class.
- If the prices are known for each size class, an informed decision can be made on the level of thinning required.
- If thinning is required to increase crop size, Exilis can be used as an alternative to hand thinning.