# Grower Summary

## TF 177

Apples: Long term effects of applied composted green waste mulch on the cropping of Braeburn and Cox

Annual 2012

## Disclaimer



The results and conclusions in this report may be based on an investigation conducted over one year. Therefore, care must be taken with the interpretation of the results.

## Use of pesticides

Only officially approved pesticides may be used in the UK. Approvals are normally granted only in relation to individual products and for specified uses. It is an offence to use non-approved products or to use approved products in a manner that does not comply with the statutory conditions of use, except where the crop or situation is the subject of an off-label extension of use.

Before using all pesticides check the approval status and conditions of use.

Read the label before use: use pesticides safely.

## 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.

HDC
Stoneleigh Park
Kenilworth
Warwickshire
CV8 2TL

Tel – 0247 669 2051

HDC is a division of the Agriculture and Horticulture Development Board.

| | |
|---|---|
| **Project Number:** | TF 177 |
| **Project Title:** | Apples: Long term effects of applied composted green waste mulch on the cropping of Braeburn and Cox |
| **Project Leader:** | Tim Biddlecombe |
| **Contractor:** | Farm Advisory Services Team Ltd |
| **Industry Representative:** | Peter Checkley |
| **Report:** | Annual Year 4 Report, 2012 |
| **Publication Date:** | 21 August 2012 |
| **Previous report/(s):** | Annual Year 3 Report, 2011 |
| **Start Date:** | 01 October 2008 |
| **End Date:** | 31 March 2013 |
| **Project Cost:** | £25,928 |

## Headline

The use of compost as a mulch increased fruit number per tree, at the same time as increasing fruit size. This resulted in yield increases of around 7kg per tree for Braeburn and 13kg for Cox.

### Background and expected deliverables

Previous work has been carried out to determine the effect of the application of composted green waste as a mulch in apple production. Positive effects on fruiting as well as growth have been observed but work tended to be relatively short term and concentrate on testing the effect in the four years following planting. This project continues on from previous work funded by WRAP which tested the effect of green waste compost mulch on the growth and fruiting of two varieties of apple (Cox and Braeburn) with an extended evaluation of the effect on growth and fruiting of the trees over four years. The final report will also include an economic analysis of the use of composted green waste as a mulch for apple production.

### Summary of the project and main conclusions

The trial was conducted on two apple varieties: Cox and Braeburn to which mulch was applied to half the field on two occasions. In 2004 when the trees were planted, a 10cm layer of compost was applied giving a rate of 30 tonnes per hectare. This was then repeated in 2007. The mulched area is being compared to one where the herbicide strip had been left bare.

Fruit number and size were recorded at harvest. A series of fruit maturity tests were conducted on both varieties during August, September and October as an additional measurement to test whether the compost mulch altered maturity characteristics and fruit quality. In addition, samples of Cox were placed in store to test whether the compost treatment altered storability. Length of shoot growth was recorded in October. Soil, leaf and fruit nutrient analysis was carried out to determine the effect of mulch on soil nutrient content and uptake by the tree. Enviroscan soil moisture probes were used to determine the effect of green compost on soil moisture content.

Fruit size increased by 6.6mm in Cox and by 5.7mm in Braeburn. Fruit number also increased in both varieties with the use of compost mulch. In Braeburn the increase was only 12 fruit per tree but for Cox the difference in fruit number was 87 fruit per tree. As in previous years, there was a difference in the amount of shoot growth between the two treatments with the compost increasing growth by 27% and 118% in Braeburn and Cox respectively. The combined effect of increased growth over the last 6 years has meant the compost treated trees have now filled their spaces whereas those in the herbicide strip have not. For this

reason, the compost treated trees were able to produce so much more fruit without a detrimental effect on fruit size.

The application of composted green waste increased the fruit nitrogen and decreased fruit phosphate levels. This has implications for fruit storability and may mean that fruit treated with compost will not store for as long as fruit from trees grown in bare soil. It will certainly mean that fertilizer and foliar feed applications need to be based on current analyses. The effect on storability was monitored by placing fruit in stores on two harvest dates. The compost treated fruit had a significantly lower percentage starch and the fruit firmness was lower confirming the detrimental effect on storability. The series of maturity tests conducted, demonstrated that the fruit from the compost treated area, matured around 2 weeks earlier than the fruit from the untreated area, having a significantly lower percentage starch and fruit firmness. It also had a yellower background colour although this was more a result of the fruit nitrogen content rather than any effect of maturity.

Clear differences in soil moisture between the two treatments have been observed in each year the project has been running. However, in 2011 the differences between the two treatments were less than in previous years. This is probably due to the extremely dry start to the season combined with the higher water demand from the compost treated trees. The main difference in 2011 was the greater percolation of water through the soil profile. Full details of the differences can be found in the Science Section of the report.

### *Main conclusions*

The use of compost as a mulch increased fruit number per tree, at the same time as increasing fruit size. This resulted in yield increases of around 7kg per tree for Braeburn and 13kg for Cox.

- Fruit and leaf nutrient levels were significantly altered by the use of compost mulch. Fertilizer and foliar feed applications need therefore to be based on recent analysis results.
- Significant differences in fruit maturity timings and storability of fruit have been observed between the two treatments. Compost mulch advanced maturity by around two weeks and reduced fruit quality after storage.
- Similar differences in soil moisture content have been seen in 2011 as in previous years. The main effect seen in 2011 though was the greater percolation of water through the soil profile in the compost treatment.

- Growth is significantly increased through the use of compost and is becoming excessive now the compost treated trees have filled their spaces. This makes careful pruning and growth regulation necessary to maintain fruiting/growth balance.

## Financial benefits

Yield of Braeburn increased by 7.3kg per tree with the addition of compost. Yield of Cox increased by 12.5kg per tree with the addition of compost. Using a farm gate price of £80 for a 330kg bin, these represent increases in return of £1.76 per tree for Braeburn and £3.03 per tree for Cox. At the density of 2,300 trees per hectare, these equate to increases in gross return of around £4,048 and £6,969 per hectare respectively. It should be noted that Paul Aylward, Manager of North Court Farm has monitored the extra costs incurred in the compost treated section and the only increased cost was the pruning which took longer in the compost treated trees due to their excessive vigour. This added an extra 30p per tree. The cost of application of compost at a rate of 50 tonnes per ha is £550 per ha. Spread over the 7 years of the orchard, to date, this would equate to an annual cost of £78 per ha. However, in the trial described here, the application rate was much greater at around 450 tonnes per ha. This would equate to an annual cost of £707 per year based on the seven year life of the orchard, but obviously this annual cost would be reduced over the complete life of the orchard.

## Action points for growers

- Use mulch to aid establishment and growth of trees.
- Mulch can be used in situations where increased growth is required. This has been shown to result in improved yield as tree volume increases.
- However, where vigour is already adequate or strong, the use of a mulch could lead to problems of excessive vigour.
- Conduct leaf and fruit analysis to determine whether fertilizer and foliar applications are necessary.
- Assess maturity and obtain fruit analysis separately to non-treated blocks of trees as maturity and storability can be affected by compost mulch applications