

COMPOSTED GREEN WASTE

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Compost and manure have traditionally been used in agriculture and horticulture as sources of nutrients and organic matter. As growing techniques changed specific nutrient deficiencies were able to be identified, this coupled with the ready availability of inorganic fertilizers and decreasing availability of compost and manure meant that the use of compost and manure declined.

The relatively recent drive to reduce landfill has prompted separation of domestic waste into metals, plastic, paper, glass and green waste, etc. for recycling rather than landfill. Green waste is often collected separately from other types of refuse and taken for processing, firstly shredding, then composting (often as windrows for around 12 weeks) and then grading by size.

The fine material screened out from this process had ready market including use in topsoil manufacture, but the larger sized fraction did not have specific end uses. This prompted funding for a range of trials by WRAP to develop end uses for larger grades of composted material in the agricultural and horticultural sectors. To date FAST Ltd and ReMaDe South East have worked jointly on a number of projects over the past five years using composted green waste to improve crop production for cereals, salads, soft fruit, top fruit and vegetables.

Both newly planted and established top fruit orchards have been assessed in these projects and varieties have included: Apple; Braeburn, Bramley, Cox, Empire, Gala, Jazz and Red Falstaff; Pear; Conference; Plum; Victoria. For soft fruit, blackcurrants and strawberries have been assessed. All of the composted green waste applied was produced by BSI PAS 100 approved compost producers ensuring that the compost applied to all of the sites was produced to the same standards.

Capacitance probes have been used to monitor the water status of soil through the profile to a depth of 1 metre. Data from these probes show that when mulch is applied trees draw water from near the soil surface compared with trees that are un-mulched. This application of mulch reduces water stress on the tree during hot dry periods, particularly on young trees that have not yet developed extensive root systems. The symptoms of this stress can be seen as the degree of leaf curling.

Soil structure is improved after the addition of composted green waste as mulch as the mulch is incorporated into the soil by organisms. Organic matter from the mulch has been visibly drawn down 15cm through the soil profile over a three year period in one Braeburn/Cox orchard monitored. This improves soil aeration and water infiltration creating a better environment for root development and function.

Another important aspect of the applied mulch is the nutrient value; composted green wastes contain useful quantities of nutrients including N, P, K, Mg, Ca, S and Fe, many of which are released slowly over a period of time. They are typically high in potassium which is important in the development of fruit sugars but it may reduce the long term storage potential in the apples if not managed correctly. I would recommend that leaf and fruit mineral analysis

be carried out and additional nutrient sprays, specifically calcium, should be applied if required.

In addition to the direct input of organic matter and nutrients we have seen an increase in the number of microbial organisms in the soil after composted green waste mulch has been applied.

This combination of nutrients water conservation, improved soil structure and increased microbial activity has been shown to positively affect the following:

- Establishment is aided in newly planted orchards with mulched trees filling their allotted spacer earlier than non-mulched trees by producing more shoots and longer shoots.
- Leaf quality has been seen to improve, the occurrence of Cox spot has been reduced and leaf colour is darker.
- As trees mulched with composted green waste have established more rapidly they have come into crop earlier than un-mulched trees. Fruit number per tree, average fruit size and average fruit weight have also been shown to be generally greater than for un-mulched trees and this can be seen in the table below.

	Mulch			No Mulch		
	Number / Tree	Size(mm) / fruit	Weight(g) / fruit	Number / Tree	Size(mm) / fruit	Weight(g) / fruit
Braeburn	257.5	62.3	120.0	176.8	61.8	117.4
Bramley (young)	90.4	76.3	171.2	50.9	73.6	156.6
Cox	112.9	64.4	128.8	83.4	64.7	116.2

- From these results it can be seen that yield can be significantly increased.

It is interesting to observe that in a number of cases where fruit were of a similar size for the mulched and un-mulched trees, although the fruit number per tree was greater for mulched trees; the fruit from mulched trees weighed more than fruit from un-mulched trees i.e. the fruit had a greater density.

So do the increased yields achieved by applying compost outweigh the cost of the compost? How much does it cost? Typically the compost itself will cost around £1-2 tonne-1, transport costs will depend entirely on how far you have to transport it, therefore find your nearest compost producer and finally there are the spreading costs. One contractor quoted £7 tonne-1, however if you plan to mulch a large area you may consider buying a spreading machine as there are several now available.

As to the benefits, typically annual yield increases are around 25-30%, although 50-55% increases in yield have been noted in several orchards. Mulch does not need to be applied on an annual basis and I would recommend applying it on a three yearly basis.

I would recommend that the 10-40mm grade should be applied as mulch for top fruit and incorporated for soft fruit. Maximum quantities applied are limited by the nitrogen content of the compost material and this will vary depending on the size grade and moisture content. Typically applications of 10-40mm compost are around 30 tonnes per hectare.