Grower Summary

TF 206

Comparison of Different Planting Material for Fruit Wall Orchard Systems for Apple

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Further information

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

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GROWER SUMMARY

Headline

- In the second fruiting year of this trial, two year old tree types yielded most fruit overall and more Class 1 fruit, with one year old unfeathered trees the least, although all tree types are developing and filling their space.

Background and expected deliverables

Growers in many countries are actively looking for ways to reduce labour inputs and increase the use of mechanical aids in a range of fruit crops. With a general decline in skilled labour, ease of management is another requirement, but in all these developments it is essential that there is no loss of yield or quality. In fact, an increase in yields will be required to enable growers to maintain profitability.

Following the successful development and commercial uptake of the Concept Orchard (AHDB Horticulture Project TF 151) by many UK growers, further evolution and development of more intensive planting systems is being considered. In TF 151, reference was made to 'Le Mur Fruitier', a newly developed orchard system in France. Further developments of this system have been carried out privately and at the PC Fruit Research Station in Sint Truiden, Belgium. Generally this work has been done in existing orchards that have been adapted to the new pruning regime and generally on varieties not grown in the UK. Results have shown that the principles developed in the work by CTIFL in France can apply in more northern growing areas. However, they need to be adapted to local growing conditions and varieties, as the timing of pruning is critical and specific to individual varieties, whilst the length of the growing season varies in different geographical areas.

Little work has been done on ways of establishing Fruit Wall orchards and which type of tree gives the best results. Conventionally produced trees have a form and structure ideally suited to wider spacings, where a branch framework is necessary, but they can be adapted to be managed in a Fruit Wall planting. However, other tree types may be more suitable, either because they are cheaper and can be planted more intensively at the same cost per hectare, or because they have been specifically grown in the nursery to form a narrow, tall tree potentially giving higher, early yields.

Several specialist nurseries are developing tree types designed and grown especially for Fruit Wall orchards. These include 'grow through trees' from several nurseries, and Bibaum® trees from Mazzoni nurseries. Other nurseries recommend that using a maiden tree or an 8 month

tree at a close planting distance can give better results. This project will provide a comparison of five different tree types using a standard variety/ rootstock and spacing, and provide growers with comparable data to allow them to make informed decisions about the best tree type to use for their own situation.

Summary of the project and main conclusions

The trial was established to compare the performance (yield and grade out) of different nursery tree types when planted in an intensive orchard, managed using the Fruit Wall system.

Trees were planted and established during 2013. Records and assessments commenced in 2014 with 2015 being the second fruiting year.

There were statistically significant results in yields - Two year old tree types yielded the most fruit (both total yield and Class 1). One year old unfeathered trees yielded the least fruit.

Fruit quality in 2015 was good.

The trees are starting to fill their space and develop cropping wood and substantial lateral branches. The two year old trees are more advanced in this respect.

Financial benefits

As the trees have only carried two small crops, it is too early to determine conclusive financial benefits.

There is potential for reducing pruning costs and skilled pruning labour requirements.

The trial is responding to the industry's needs to shorten payback periods and to produce guidance on the cropping potential of different tree types in the early years.

The cost of establishing an intensive orchard is currently between £22k and £28k per hectare. In particular:

- The differences in cost of the various tree types available is quite small (typically around £0.50 per tree or £1500 per ha), but a reduction in yield of 5% in each of the first four cropping years can reduce net returns by around £3,000 per ha. Some tree types have the potential to fill their space, vertically and horizontally, much more quickly, leading to increases in early yields, whilst others require more inputs in terms of pruning and thinning in order to achieve successful establishment.

- Although new intensive orchard systems are simpler and easier to prune than lower density traditional orchards, it can still take between 25 and 40 man hours to prune a 1 ha orchard. Rates of mechanical pruning are between 1.5 and 2.5 hours per ha depending

on planting distance. Some hand pruning will be needed even where mechanical pruning is used but net savings of around £3,000 per ha over a 15 year orchard life are envisaged (net of machinery cost).

- Anecdotal evidence from experimental plots in Northern Europe suggests that annual yields from Fruit Wall plantings can be around 20 tonnes per ha greater than orchards of a similar density managed conventionally. The value to the grower of this increase would be approximately £21,000 net of all post-harvest costs over 15 years.

- For growers to implement the system they would have to rent or buy specialist pruning equipment. Current costs for this type of equipment are in the region of £14,000, but the machine also has the capability of being used for other operations on the farm such as hedge and windbreak cutting.

- There will be a need for good technology and knowledge transfer and possibly further development work. This is because the interaction between the Fruit Wall growing system and other orchard management operations (such as use of growth regulators for fruit setting and thinning) could well be different (possibly due to the effects of late pruning on leaf metabolism at a critical time of year during the early fruit development phase). As the leaf to fruit ratio is altered in the Fruit Wall, more attention to crop nutrition and leaf health will be necessary.

Action points for growers

- 2015 was the second fruiting season of the trial.
- The Fruit Wall cut was carried out when 9 new leaves had emerged on the current season's growth. To determine this growers need to regularly make random leaf counts to establish the growth stage before making the cut.
- Other action points will be determined in future years when it is established which tree type may be most suitable to Fruit Wall management in terms of early yield build up and highest yield of Class 1 fruit.