

Tree fruit

Project No. TF 154

The use of root pruning in apples and pears

Tim Biddlecombe, FAST

This factsheet is based on both grower experience and on the results of three years of trials conducted in a Cox and a Conference orchard in Kent for HDC project TF 154 – Apples and Pears: Investigation into the effects of root pruning on growth and cropping.

Introduction

Root pruning is a viable alternative to chemical growth control in apples and pears. The technique involves drawing a blade, usually 50 cm in length, through the soil to sever the roots (Figure 1). The blade is ideally mounted at an angle to ensure that the tap roots are severed leaving the feeding hair roots closer to the surface less affected. Specialist machinery is available in the Netherlands and may be bought or hired in the UK (see 'Further Information' section).

The TF 154 trials looked at the effect on tree growth and fruit size of pruning at different timings and distances from the trunk over a three year period. Investigations were also made into how root pruning altered the nutrient and water uptake.

The guidelines in this factsheet are based on those findings and should be applicable in a wide range of orchards.

Timing

- Root pruning should be carried out while the trees are fully dormant between November and February and no later than six weeks before the anticipated bud burst.
- Pears are therefore best treated before Christmas.
- A follow up treatment in July can increase the effect on growth control without adversely affecting fruit size.
- Although root pruning at petal fall reduces growth it should be

avoided as it can have a detrimental effect on fruit size.

may be done closer and supplementary irrigation used to mitigate the effect on fruit size.

Distance from the trunk

The closer the root pruning treatment is applied to the trunk, the greater the growth control but also the greater the reduction in the fruit size.

- The optimum distance to give good growth control without too much reduction in fruit size is approximately two thirds of the way from the trunk to the edge of the tree canopy (Diagram 1 overleaf).
- Where irrigation is available pruning

Managing soil moisture

Measurements during the trial clearly showed that root pruned trees were drawing water from a greater depth than untreated control trees. This requires more energy and is less efficient than drawing water from near the surface.

- Supplementing available moisture by irrigation or conserving it through mulching will help maintain fruit size in root pruned orchards.



1 Root pruning during the dormant season in Cox. Note: the use of an angled blade on the right hand side of the picture in the treated rows and a vertical stabilising blade on the left hand side of the picture

Nutrition

Root pruning creates only relatively small effects on the nutrient content of leaves and fruit from the treatments, but nitrogen and magnesium levels may be reduced in Cox and potassium levels can be reduced in Conference.

- It is therefore advisable that regular monitoring of the leaf mineral content is carried out and supplementary feeds and top dressings applied as necessary.
- This will be more important in heavy cropping orchards and in orchards where root pruning has been carried out for several years in succession.
- Top dressings should only be applied down the tree rows to the area between the root pruning slits.

Caution with herbicides

- Do not apply herbicides immediately after root pruning as the material may easily come into contact with the cut root surfaces and cause damage to the tree.
- Either wait for the slits to close up or use a press wheel behind the blade.

Action points

- Try the technique by applying it in the dormant period at approximately two thirds of the way from

Long term effects

During the trial in Project TF 154, no long term cumulative effects were noted but the degree of growth control was affected by seasonal factors, most notably spring and summer rainfall.

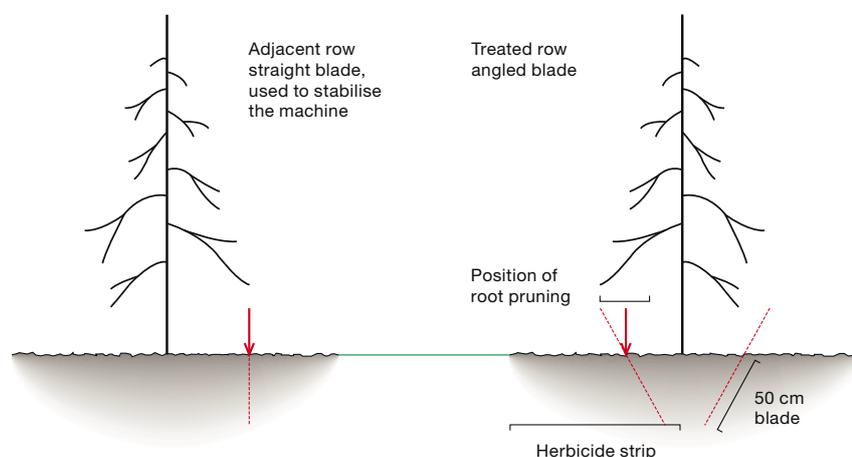
Adopt a flexible practical approach

The technique does allow growers to fine tune the treatments depending on the degree of growth control

required and seasonal factors such as crop load and growing conditions. Options include:

- varying the distance of the pruning slot from the trunk
- treating only one side of the tree one year and the other side the next
- applying a follow up treatment approximately 3 – 4 weeks after petal fall if growth is strong and fruit set is poor
- using the technique to deliberately reduce fruit size in large fruiting varieties (eg Jonagold).

Diagram 1 Root pruning treatment



- the trunk to the edge of the tree canopy.
- Monitor the results and adjust the distances for greater or lesser control in subsequent years.

- Be prepared to repeat in late June/July if growth control is not adequate.

Further information

Equipment supplies

NP Seymour, Avon Works
Cranbrook, Kent TN17 2PT
Tel. (01580) 712200
Email. sales@npseymour.co.uk

Further information: A full copy of the final report for HDC Project No. TF 154 is available from the HDC office (01732 848383).

Whilst publications issued under the auspices of the HDC are prepared from the best available information, neither the authors nor the HDC can accept any responsibility for inaccuracy or liability for loss, damage or injury from the application of any concept or procedure discussed.

© 2008
Agriculture and Horticulture Development Board.
No part of this publication may be reproduced in any form or by any means without prior permission of the Horticultural Development Company.

Design and production: HDR Visual Communication