Efficacy Guideline 403

Provision of information on tree canopy size in efficacy trials in apple orchards

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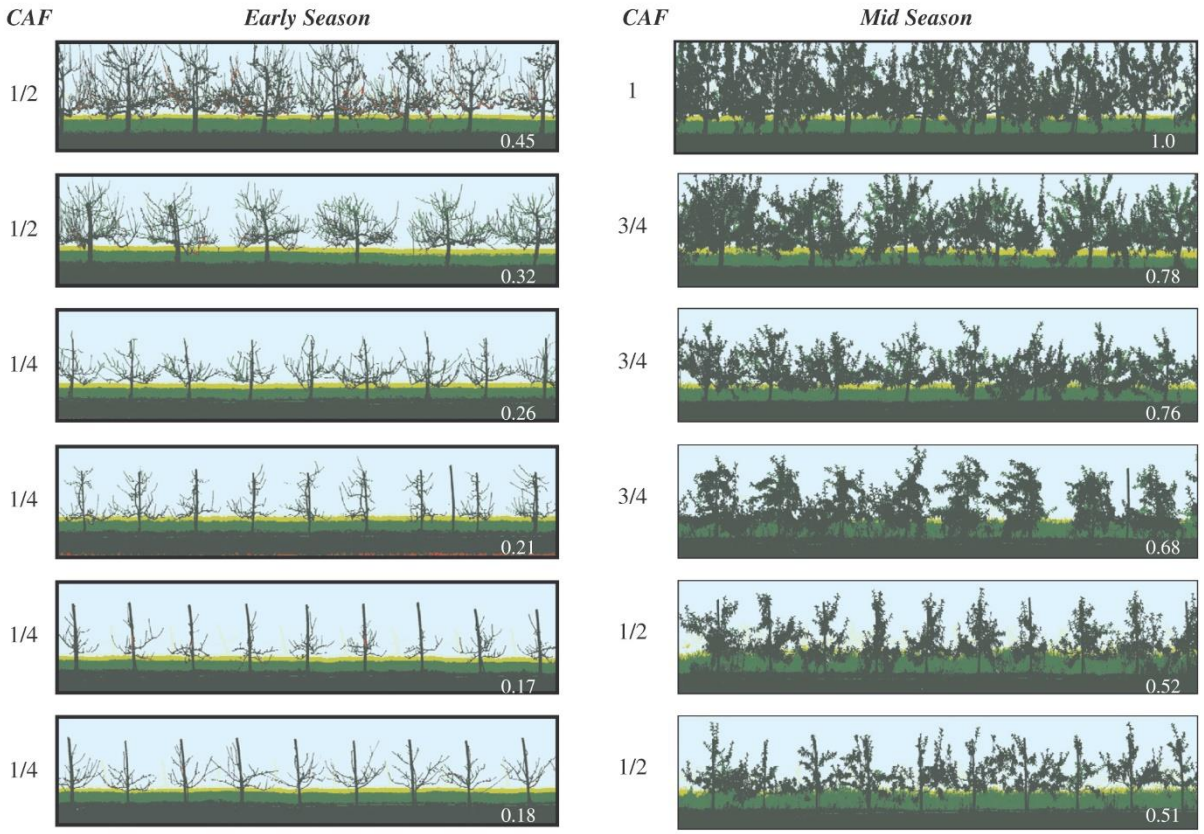
Introduction

There is considerable variation in the foliar canopy density between trees of different sizes and different growth stages. When spraying with axial fan equipment, the average deposit achieved has been found to increase markedly with decreasing canopy density and tree size.

CRD funded work towards the development of a method to enable those applying pesticides in orchards to achieve an approximately constant deposit on trees of different size and canopy density. Thus where trees are small and less dense it is possible to determine a reduced dose that will maintain biological efficacy. The scheme provides a series of pictographs of typical apple trees of different canopy density to aid assessment of the 'Crop Adjustment Factor' (CAF) which is then used to calculate the applied pesticide dose for a given orchard. Underpinning the scheme is the assumption that the label recommended dose is the maximum efficacious, based on trees with a large canopy density, and these have been given a CAF value of 1 (one). Currently the scheme and pictographs relate to orchards where trees are in single rows and where row spacing is up to 5.5m.



In developing recommendations for product labels, efficacy are likely to be conducted in a number of orchards that vary in their canopy size and density. Interpretation of results requires all relevant information, including canopy size and structure, to be recorded and presented in the trials reports and regulatory submissions/biological assessment dossier. Further details are provided in EPPO PP 1/239 'Dose Expression for plant protection products', which recommends leaf wall area (LWA) as the common parameter to measure for efficacy trials in high growing crops (including orchards). All relevant orchard measurements must be made to then convert to amount applied/ground area (required for GAP tables, and the UK National label).

Estimation of canopy size by assessment of the 'Crop Adjustment Factor'

There are a number of estimates of canopy size that can be made, and CRD has previously requested information such as tree height and width, growth stage and row spacing. However, the pictographs developed for the scheme also provide a means by which the canopy density of trees used in experimental trials can be 'quantified' by an assessment of the 'crop adjustment factor' or CAF value.

Pictographs for a range of trees in orchards (of row spacing up to 5.5m and with trees in single rows) are presented below. They detail a CAF value, as would be used by the scheme to adjust pesticide dose, for a series of trees of different sizes either early season (i.e. pre-blossom) or mid season (fruit maturity at maximum leaf). Also shown in white on the pictograph is the actual CAF value (not rounded) which has been determined by opto-electronic or LIDAR measurement.

Label advice

It is important that labels give clear advice to users on the dose appropriate to an orchard. The label should generally recommend the higher dose applicable to a full height tree typical of UK orchards, (e.g. a 3 – 3.5m tree) at full canopy density, (unless the label species a specific pre-blossom or early season recommendation). In addition, the label could include usefully include wording to note that: *where tree height and or canopy density is reduced, the dose (and water volume) should be adjusted in accordance with an appropriate dose adjustment scheme (see AHDB for further details).*

PACE

The scheme, known as the PACE scheme (Pesticide dose Adjustment to the Crop Environment) was developed jointly by Silsoe Research Institute and Horticultural Research International (HRI). The method was developed and the scheme launched to apple growers in November 2005, outlining the opportunities for reducing doses by making adjustments for canopy density.

Further information

For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit www.hse.gov.uk.

This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory, unless specifically stated, and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance.

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