Carrot Foliage Clipping For Integrated Control of Sclerotinia

Project Partners;

BASF, Wroot Water and Howard Hinds Crop Consultancy

Introduction

The clipping of carrot rows is a technique which has been developed in Canada to open up crop canopies to increase air flow and therefore decrease disease risk. Results have been successful and some carrot growers are now employing the technique on a commercial basis.

In the UK the dominant variety Nairobi is very prone to canopy collapse, and can result in lodged foliage developing tissue rot when it contacts the ground. It is at this stage the crop becomes very susceptible to sclerotinia infection. Quite often infection can be seen initiating on the side of the bed in the direction of foliage collapse, which is usually influenced by the prevailing wind. In 2008 a trial was carried out to assess the effect of clipping the bed sides in a crop of Nairobi grown in Nottinghamshire. Clipping was achieved using an adapted flail. Results showed that clipping reduced foliage infection by over 50% and crown rot by over 30%.

The aim of this trial was to repeat the 2008 work with more sites and using a specially designed clipper based on the Canadian design.

Method

Three Nairobi fields were selected in Nottinghamshire, 2 fields grown for Strawson Limited (ref RB1 & RB2) and one for Sherwood Produce (ref PP1). Clipping of the bed sides took place in early August when the foliage had started to collapse. 8 beds were clipped in RB1 & RB2 and 20 beds in PP1. In RB1 collapse was most advanced and low levels of sclerotinia infection were already present in the crop.

Wroot Water had designed a single bed clipper for the evaluation based on the Canadian clipper which uses a round disc cutting into the soil at the edge of the bed. The disc was driven manually with the forward speed of the tractor.
Assessments

Foliage was assessed for sclerotinia infection in early September and early October. For clipped and adjacent unclipped beds foliage was assessed for presence of white mycelium by lifting up the canopy. Each side of the bed was assessed every 3m for 50 positions (150m bed length). This was replicated in 3 beds for both treatments.

Results

In the early September assessment Charts 1 below shows clipping reduced infection by; 61% in RB1 field, 82% in RB2 and 94% at PP1. By the next assessment in early October (Chart 2) the level of control in the fields had reduced to; 39% in RB1, 85% in RB2 and 74% in PP1.
**Discussion**

In 2009 infection pressure was lower than in 2008. Unclipped plots averaged 9% in the September assessment compared to 73% in 2008. Even by October infection in the unclipped beds had only risen to 13%.

Despite the lower disease pressure clipping of the beds has for the second year shown significant benefits in reducing sclerotinia infection. RB2 & PP1 gave most control compared to RB1. This is most likely due to the presence of sclerotinia already in the RB1 field when clipped in August whereas R2 and PP1 had no signs of infection at this stage. This effect highlights the importance in timing of clipping.

In both years the infection found in the clipped beds mainly originated from the middle area of the bed. To overcome this and improve control further a different drilling configuration will be required in which carrot bands are drilled on small ridges instead of flat beds. This will allow the clipper to open up the middle area of the beds to allow more air flow. Clipping the existing bed system however is giving worthwhile results to be used on a commercial scale in high risk crops.

Another advantage of opening up the canopy is that later fungicides treatments can be better targeted to the lower stems areas and so be more effective. As part of an integrated control strategy, this technique therefore has the potential to reduce the input of late season fungicides.

**Further Work**

For 2010 the design of 3 bed clipper is planned with the aim of cutting larger areas of crop. A large scale trial based on investigating the potential for reducing late season fungicides in combination with the technique will be proposed. In addition an evaluation of using this technique on a mini-ridge bed system is also planned.