Fungicides for phoma control in winter oilseed rape

Summary of AHDB Cereals & Oilseeds fungicide project
2010–2014 (RD-2007-3457) and 2015 (214-0006)
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Background

Fungicides for control of phoma leaf spot and stem canker have been evaluated over the last six years at ADAS Boxworth, Cambridgeshire and ADAS Terrington, Norfolk on the susceptible variety Catana. Products have been predominately tested at full and half label rate, however, for the new project all are being tested at four doses (¼, ½, ¾ and full label rate) as two spray programmes, plus a completely untreated control. The first fungicide application is in the autumn (ideally 10-20% plants affected) with a second application about 4 to 10 weeks later when re-infection at a similar threshold is apparent. Leaf disease assessments are done after each application and stem canker assessed in late June (presented as a canker index 0-100). Combine harvested yield data are adjusted to 91% dry matter.

Priority in this project is given to products not currently approved to allow independent data to be available when they come to market. Existing data from the previous project (2010 to 2014) will continue to be included in these updates. This will allow information to be made available for existing products where sufficient data were gathered previously but space is no longer available for them to be included in the experiments.

Results

Mean data for 2010–2014

Good control of phoma leaf spot and stem canker was obtained with well-timed two-spray programmes (Figure 1). Yield responses have averaged about 0.3 t/ha from two sprays at half dose and were larger in years with moderate or severe stem canker epidemics. Metconazole and tebuconazole gave smaller responses than other products and are known from previous experiments to be less effective when used in eradicant compared to protectant situations. Experiments have been done on crops with various plant sizes, and negative yield effects can be seen when products with growth regulatory activity are used on small plants in the autumn, particularly at greater than half dose.
Figure 1. Phoma canker control (bars) and yield (points) averaged over 8 experiments during 2011 to 2014 with a range of canker severities. *Orius 20EW data based on two years data.

2014

In the 2014 harvest experiment, canker severity was low at Terrington (index 27) and moderate (index 42) at Boxworth. This reflected the differences in the speed of epidemic development and the severity of infection at each site. Phoma leaf spot incidence at Boxworth was high when first sprays were applied at the 11-leaf stage on 7 November (68% plants affected) whilst Terrington had 84% of plants affected at the 6-leaf stage on 8 November. Second sprays were applied on 12 December at Terrington (87% incidence; 0.5% leaf area affected) and 26 November at Boxworth (100% incidence; 2.0% leaf area affected). Picoxystrobin + penthiopyrad (as Refinzar) was included for the first time in phoma experiments in 2014. Although plants at the Boxworth site were larger than average but there was a significant reduction in stem canker and a significant yield response to fungicides of up to 0.81 t/ha (untreated 3.37 t/ha) (Figure 2). There was no significant effect of treatments on yield at Terrington (data not shown), which was a high yielding site (untreated 4.83 t/ha). There was a significant reduction in canker from some treatments at Boxworth but not at Terrington, although most treatments had less canker than the untreated control.

These data, particularly those from Terrington in 2014, are consistent with previous results as small cankers have little effect on yield (canker indices less than 30). Fungicides may still produce benefits through plant growth regulatory effects on rooting and canopy regulation; however, yield trends at Terrington in 2014 suggested higher rates of growth regulatory fungicides (>0.5 label rate) generally had a negative impact on yield when applied to small plants. At Boxworth, canker indices were significantly higher where some products with growth regulatory properties were
applied compared to others, however, there was little or no negative impact on yield. It is likely that the autumn growth regulation of larger plants contributed to this yield benefit and this effect has been observed in previous oilseed rape fungicide performance trials.

2015

Stem canker severity was moderate at Terrington (index 55) and low at Boxworth (index 27) prior to harvest in 2015. Phoma leaf spot incidence at Boxworth was low when first sprays were applied at the 8-leaf stage on 30 October (12% plants affected in untreated control). At Terrington, phoma leaf spot levels were moderate with 50% of plants affected in the untreated control at the 8-leaf stage on 31 October indicating a more eradicant situation. This should be considered when interpreting product performance particularly where products with growth regulatory activity were applied (e.g. tebuconazole) as these have been shown previously to perform better in protectant situations. Second sprays were applied on 9 December at Terrington (48% incidence; 0.1% leaf area affected) and 9 December at Boxworth (43% incidence; 0.1% leaf area affected). At Terrington, there was a significant effect of treatment on stem canker severity and yield (Figure 2). In this experiment, reducing stem canker index to less than 45 gave a significant increase in yield for all products relative to the untreated control. This was a high yielding site (untreated yield = 4.55 t/ha) and yield responses ranged from 0.21 to 0.54 t/ha. Disease severity was low and yields at the Boxworth site were variable and could not be used for treatment comparison so are not included in this update.
Figure 3. Phoma stem canker control (a.) and yield (b.) response in relation to fungicide dose at Terrington, Norfolk in 2015.
Key points for assessing and managing phoma leaf spot/stem canker risk in harvest year 2016

Use the phoma forecast on the Rothamsted Research website (also linked from the AHDB Cereals and Oilseeds website) to guide crop monitoring and for planning fungicide applications. 
http://www.rothamsted.ac.uk/phoma-leaf-spot-forecast

Fungicide application timing is important and the first application should be made on crops (RL rating 7 and below) when 10-20% of plants have phoma leaf spot and the second application when re-infection is evident (4 to 10 weeks later). Note some varieties with high resistance ratings for stem canker (RL rating 8 and above) also have good resistance to phoma leaf spot and may not require a phoma fungicide unless the 20% threshold is exceeded. Some varieties are likely to require an autumn fungicide (November) for light leaf spot control if there is a risk and should be considered when planning autumn programmes.

Good control of phoma leaf spot and stem canker can be achieved with two sprays at half rate.

Early phoma epidemics are the most damaging to yield and typically put 0.5 t/ha of yield at risk, although rapid re-infection in the autumn can also reduce yields. Late epidemics occurring in February/March can be very damaging if plants are small in late autumn or winter. It should be noted that all triazoles offer protection when applied prior to infection, though product choice will also be influenced by requirements for curative activity when small plants are infected. Conversely, products with plant growth regulatory activity (e.g. metconazole or tebuconazole) may be favoured in a protectant situation where plants are large and reach 6 leaves in early/mid-October.

New information on fungicide efficacy – products

In addition to azoles, there are now non-azole options for phoma control. Pictor, an SDHI + strobilurin co-formulation (200g/L boscalid + 200g/L dimoxystrobin: BASF), can provide phoma control and data are available from 2015 experiments. It was applied as a two-spray programme to compare efficacy in this trial series, however, there are restrictions on its use and it cannot be applied to the crop before 1 February or prior to growth stage BBCH 20 (no side shoots visible) in year of harvest. This would normally be too late for preventing phoma cankers except possibly where plants are small. The maximum label rate for Pictor is 0.5 L/ha and it can be applied twice up to 50% pods reached final size (GS75).

Refinzar, an SDHI + strobilurin co-formulation (160g/L penthiopyrad + 80g/L picoxystrobin: DuPont), was available for the first time in autumn 2014 and was also included in 2015 experiments. It was applied as a two-spray programme to determine efficacy against phoma leaf
spot and stem canker in these trials relative to current commercial products. However, it should be noted the product is restricted by the label to one application per season at the full recommended label rate (1.0 L/ha) with a latest application timing of GS30 (stem extension).

Cirkon, an azole co-formulation (400g/L prochloraz + 90g/L propiconazole), was included for the first time in trials in 2015. It can be used in the autumn and spring for light leaf spot and phoma control. It can be applied twice at the full recommended label rate (1.125 L/ha) but cannot be applied to the crop during flowering (GS 59 to 69).

Note: label recommendations can change – consult latest version before use.