Management of Light Leaf Spot (*Pyrenopeziza brassicae*) and Canker (*Leptosphaeria maculans*) in Winter Oilseed Rape using Varieties and Fungicides

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Recent surveys of diseases in commercial crops of winter oilseed rape have confirmed that light leaf spot (*Pyrenopeziza brassicae*) and phoma canker (*Leptosphaeria maculans*) are the most important causes of yield loss in the UK (Fitt *et al*., 1997). A range of new fungicides have become available for use against these two diseases in winter oilseed rape, but data on their disease control efficacy in relation to dose and timing is limited. Furthermore, the relative contribution of cultivar resistance and fungicides to disease control has also received limited attention apart from variety trials with standard treated and untreated comparisons. This paper summarises some of the results from 12 experiments designed to investigate fungicide and variety interactions, which were carried out in north, east and south west England and in Scotland in harvest years 1995-1997.

The light leaf spot susceptible cultivar Bristol (resistance rating 3) was compared with a resistant cultivar, either Rocket (rating 7, at 7 sites) or Nickel (rating 9, at 5 sites). These cultivars had contrasting resistant ratings for canker, Bristol rated 5 for canker resistance, Rocket and Nickel both rated 4 (Anon., 1995). A range of fungicide treatments (carbendazim, difenoconazole, flusilazole + carbendazim and tebuconazole)were applied to both cultivars as a single full label dose in the autumn or as two half doses applied in autumn and spring. An additional control treatment of two full doses of flusilazole + carbendazim applied in autumn and spring (twice the label recommended dose) was also included. Treatments were applied when disease activity was detected in autumn, usually mid-November, and at early stem extension stage in spring in 200-300 litres water/ha by gas pressurised Oxford Precision sprayers. At one site, autumn treatments were not applied because seedlings remained very small and mean results are derived from a cross-site analysis of eleven crops.

Light leaf spot was the most important disease in this series of experiments. The most severe attack occurred in the experiment near Aberdeen, Scotland in 1995 where plant survival during the winter was substantially reduced. The yield of untreated Bristol was 1.04 t/ha, whilst untreated Rocket yielded 3.50 t/ha. The highest yields on both cultivars followed two full dose applications of flusilazole +

carbendazim and were 2.44 t/ha on cv. Bristol and 4.06 t/ha on cv. Rocket. This experiment illustrates a number of key findings : 1) the value of good resistance to light leaf spot (both cultivars gave similar yields at low disease sites) which arguably was equivalent to 2.46 t/ha in an untreated situation and 1.62 t/ha after full fungicide treatment, 2)the most serious impact of light leaf spot occurs when plant survival over-winter is reduced, 3) under high disease pressure, even resistant cultivars may justify treatment as a yield response of 0.56 t/ha was obtained on Rocket, 4)two fungicide sprays were not able to recover all the yield loss caused by light leaf spot, 5) it appears to be more cost-effective to grow a resistant cultivar without fungicide treatments than to grow a susceptible cultivar and use fungicides.

Under lower light leaf spot pressure, the largest yield responses in south west England on cv. Bristol in 1996 were obtained with two spray programmes of flusilazole + carben dazim or tebuconazole at half dose. These sprays gave long lasting control of light leaf spot, indeed, the single full rate application of these fungicides made on 4 December still gave 90% control of light leaf spot on stems in June. This effect is consistent with other results suggesting that there is a limited period in late autumn when light leaf spot inoculum enters the crop. If this initial phase can be controlled, secondary spread is substantially reduced.

An overall appraisal of 11 experiments gave a yield response to the two full doses of flusilazole + carbendazim of 0.52 t/ha on cv. Bristol and 0.35 t/ha on cv. Nickel or Rocket. Two half doses of the same fungicide gave yield responses of 0.28 t/ha and 0.23 t/ha respectively (untreated yields were 3.19 t/ha for cv. Bristol and 3.82 t/ha for cvs Rocket or Nickel). In this case, a single full dose of flusilazole + carbendazim in autumn gave a yield response of 0.38 t/ha and the highest margin over fungicide cost (£32/ha). This differed from tebuconazole and difenoconazole, which gave better yields and margins when applied as two half doses (autumn + spring) rather than as a single spray at full dose in autumn. On cvs Rocket and Nickel, mean responses to fungicide were generally very small and gave negative or small positive (£2-12/ha) margins over fungicide costs.

The highest yield from treated cv. Bristol was 3.71 t/ha, which was lower than the 3.82 t/ha untreated yield of the more light leaf spot resistant cultivars Rocket and Nickel

Whilst average responses to fungicides are of interest, developing an understanding of the factors which affect yield response will ultimately be required to improve decision making at the crop level. An important feature of this experimental series was the largest variation in yield responses between sites and seasons. There were few responses to fungicides in eastern England (Suffolk) where both light leaf spot and phoma canker caused only slight infection. At the site near Aberdeen, Scotland, usually considered a high risk area for light leaf spot, yield responses were not significant for most commercial regimes in 1996/97. Careful targeting of treatments is required to achieve profitable responses to fungicides. Further work is required to improve the identification of crops with a risk of yield loss and this is being addressed through a co-ordinated programme on oilseed rape diseases in the UK.

References

ANONYMOUS, 1995 - *Oilseeds variety handbook, NIAB recommended and descriptive lists of oilseed crops 1995*. Cambridge, UK: National Institute of Agricultural Botany.

FITT B.D.L., GLADDERS P., TURNER J.A., SUTHERLAND KG., WELHAM S.J. and DAVIES, J.M.Ll., 1997 - Prospects for developing a forecasting scheme to optimise use of fungicides for disease control on winter oilseed rape in the UK -*Aspects of Applied Biology* 48**,** *Optimising pesticide applications*, 135-142.

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