

Project number:	RD-2008-3498
Project title:	Strategies to reduce the impact of <i>Turnip yellows virus</i> on oilseed rape production in the UK
Lead partner:	Broom's Barn (Rothamsted)
Scientific partners:	N/A
Industry partners:	Velcourt
Government sponsor:	N/A
Start date and duration:	January 2009 for 40 months

Project aim: To raise the awareness of and develop integrated strategies for the control of *Turnip yellows virus* (TuYV) in oilseed rape in the UK and to raise the productivity of UK oilseed rape.

Key messages emerging from the project:

- A nationwide survey in conjunction with Velcourt farms (March and April 2009) showed high levels of TuYV infection (up to 70%) in fields in key production areas including sites along the south coast and around the Wash.
- In a trial at Broom's Barn, artificially inoculated with TuYV (October 2008) and harvested in August 2009, TuYV decreased the yield of nine of the varieties by between 12 and 30%.
- Twenty-nine percent of *Myzuz persicae* (peach-potato aphid) trapped in yellow water pans at 13 Velcourt farms between September and November 2009 contained TuYV.
- Levels of virus in these crops when tested in December 2009 ranged from 0 to 78%. There was a close correlation between numbers of aphids caught in the autumn and the amount of virus present, regardless of insecticide treatment(s) applied.
- TuYV is an important disease of UK oilseed rape and must be considered as a factor that limits the yield potential of the crop in this country.

Summary of results from reporting year:

In 2009, the TuYV survey was conducted during March and April and covered oilseed rape crops on 80 farms from the south coast of England to Scotland. Fifty samples were randomly taken from each field and tested for the presence of virus by ELISA using TuYV specific antibodies. Virus 'hotspots' (up to 70%) were identified along the south coast and close to the Wash. These results were surprising in context to the previous autumn as very few aphids were generally observed because of the cooler and wetter conditions experienced.

In September 2008 a trial (80 plots) was established to determine the impact of TuYV on ten current RL varieties. Within the trial each variety was replicated four times with and without virus. Appropriate plots were inoculated with viruliferous aphids at the end of October. After inoculation a series of frosts were experienced (-6°C) and when plants were subsequently sampled for virus during the following spring the mean level of infection was only approximately 30%. However, no virus was identified in any of

the plots that were not inoculated. Virus symptoms were evident from March onwards and there appeared to be different levels of symptom expression between the varieties; this will be investigated further. At harvest, the yield of nine of the varieties was decreased when compared to equivalent uninoculated control plots; of these four were significantly lower and the reduction in yield performance ranged from 12-30%.

The autumn migration of *M. persicae* was monitored within 13 oilseed rape fields between September and November using yellow water pans. Most aphids were caught in September and October; sites in Kent and Lincolnshire had the highest numbers of aphids. Overall, 29% of the aphids trapped contained TuYV when assessed using diagnostic methods. The level of TuYV infection in these crops was then measured in December. This ranged from 0 – 78% and was closely related to the number of aphids caught previously, regardless of any seed treatments or foliar insecticides applied.

Key issues to be addressed in the next year:

- To determine the extent of TuYV infection in the national crop in the spring of 2010.
- To determine whether there are any differences between current varieties and symptom expression of TuYV in artificially inoculated trials (infected October 2009).
- To determine the effects of TuYV on the physiology and growth of current varieties.
- To determine the impact of timing of TuYV infection (September-March) in a sequentially inoculated trial at Broom's Barn.
- To monitor the autumn migration of *M. persicae* in oilseed rape crops, determine the levels of TuYV within these populations and to provide this information to the oilseed rape industry so that appropriate control strategies can be applied.

The results described in these summary reports are interim and relate to one year. In all cases, the reports refer to projects that extend over a number of years. The Home-Grown Cereals Authority (HGCA) has provided funding for this project but has not conducted the research or written this report. While the author has worked on the best information available to them, neither HGCA nor the author shall be liable for any loss, damage or injury howsoever suffered directly or indirectly in relation to the report or the research on which it is based. Reference herein to trade names and proprietary products without stating that they are protected does not imply that they may be regarded as unprotected and thus free for general use. No endorsement of named products is intended, nor is any criticism implied of other alternative, but unnamed products.