

Genes identified to protect brassicas from damaging disease

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Scientists have identified a new way to breed brassicas, which include broccoli, cabbage and oilseed rape, resistant to a damaging virus. Their discovery has characterised a form of resistance that appears to be durable, broad-spectrum and unlikely to be overcome by the virus over time. Turnip mosaic virus (TuMV) is an economically devastating virus that infects a wide range of cultivated plants, but especially brassicas.

In research published recently in the *Journal of General Virology*, scientists at Warwick HRI and collaborators have identified genes that confer resistance to the virus and, crucially, as multiple genes are involved, provide resistance that the virus appears not to have been able to evolve to overcome.

The research, funded by the Biotechnology and Biological Sciences Research Council (BBSRC) and others, could have important broader implications for plant breeders and farmers as TuMV is a member of the Potyvirus family – the biggest family of viruses that attack plants – and an important model for understanding other viruses.

The Warwick HRI scientists have examined a number of types of genes that determine plant responses to virus attack. One response is for the plant to kill off individual cells if they become infected, thereby restricting the viral infection to a very localised area of the plant. Another response is to restrict virus movement within the plant and stop its spread from leaf to leaf. The researchers have identified a number of genes that appear to not allow any replication of the virus in plants when

it is introduced into the plant.

Dr John Walsh, the research group leader, said: “Turnip mosaic virus can cause big economic losses for farmers. We have identified multiple genes that give some varieties of brassica resistance to the virus. By breeding these genes into commercial varieties of the crop, using conventional techniques, breeders can protect them from attack. But most importantly, we have identified broad-spectrum resistance provided by a number of genes. This means we potentially have the means to develop brassicas, such as broccoli, that will be robust enough to prevent the virus mutating to overcome the resistance.”

Professor Simon Bright, Director of Warwick HRI, commented: “This research demonstrates the importance of centres such as Warwick HRI in linking fundamental bioscience to developments that benefit growers and consumers. In the three years since we transferred to become part of the University of Warwick, Warwick HRI has built on its core strengths in horticulture and is now at the forefront of efforts, such as the BBSRC Crop Science Initiative, to turn excellent plant science in to real benefits for crop production.”

Source: Biotechnology and Biological Sciences Research Council

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