

Virus vector aphid ecology and epidemiology in the potato crop.

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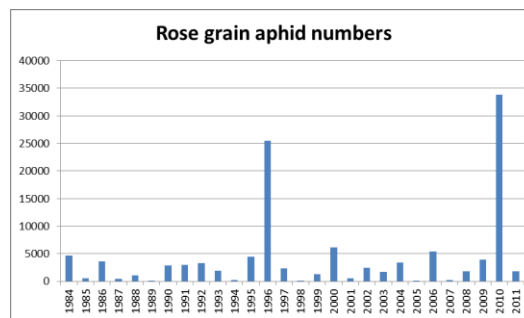
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A *Metopolophium dirhodum* nymph.

Background and rationale

Sustainable management of aphid vectors of potato viruses is important for the propagation of classified potato seed. Aphids are the major vectors of many viruses including potato leafroll virus (PLRV), potato virus A (PVA) and potato virus Y (PVY). Although the peach-potato aphid, *Myzus persicae*, is one of the most efficient vectors, it is often not the most numerous species. The cereal aphids *Rhopalosiphum padi*, and *Metopolophium dirhodum* have been shown by experimental methods to be less efficient than *M. persicae* in spreading PVY, yet they can be far more prevalent in fields. The ecology of these colonising and non-colonising species drives the relative importance of their pest status. The rose grain aphid overwinters as eggs on roses before it moves to cereals in the spring and summer. In some seasons it can be one of the most abundant aphids (see graph). Determining from when and where the greatest threat of transmitting aphids originate is particularly useful information for targeting control methods.



Data from Dundee suction trap courtesy of SASA.

Aim/Scope

The projects aim to develop molecular diagnostics for detecting PVA and PVY virus particles in aphids. The techniques will be used to examine field collected aphid specimens from experimental and agricultural study sites.

Methods/Approach

Yellow bowl traps (YBT) are used extensively in the field to record aphids flying onto potato crops in order to plan the timing of insecticide application and assess risk of virus transmission. The traps contain water and 0.1% detergent to limit aphids escaping the water surface. They are serviced weekly. The virus risk is calculated by multiplying the number of aphids from each species by a virus efficiency factor. These traps also represent an opportunity to monitor the actual frequency of virus carrying aphids flying onto potato crops using molecular-based diagnostic probes.

Reference:

Insecticide resistance profiles can be misleading in predicting survival of *Myzus persicae* genotypes on potato crops following application of different insecticide classes. van Toor, Malloch, Anderson, Dawson and Fenton (2012). Pest Management Science. (in press)