

DETERMINATION OF PVY-TRANSMISSION EFFICIENCIES OF DIFFERENT APHIDS SPECIES: A NEW APPROACH

Sébastien Boquel^{1,2}; Arnaud Ameline²; Philippe Giordanengo².

¹GIE, Station de Recherche et de Création Variétale du Comité Nord, 76110 Bretteville-du-Grand-Caux ;

²Université de Picardie Jules Verne, Laboratoire de Biologie des Entomophages, 33 rue Saint Leu, 80039 Amiens Cedex, France.
arnaud.ameline@u-picardie.fr

Non-persistent viruses, transmitted by a broad range of aphids including transient non-colonizing ones, are of main concern in the context of crop production as their epidemics can cause substantial economic losses. Relative efficiency factor (REF), which allows comparison of aphid vectoring efficiencies between species, is frequently used in literature. However, in the *Potato virus Y* pathosystem, reported REFs show strong variations according to the different studies. The aim of this study was to develop an alternative methodology to optimize the REF assessment. *In vitro* micropropagated potato plantlets were used as target plants to get phenotypically and genetically homogeneous material and minimize the bias due to plant defence response. Species-specific acquisition access period (AAP) (i.e. the time elapsed from the aphid contact with the infected plant until the first intracellular puncture) on a PVY-infected plant was assessed for each aphid species using electrical penetration graph technique (EPG). Finally, aphid clones were used to minimize intraspecific variability. EPG monitoring of aphid probing behaviour showed highly variable AAPs between the different aphid species. Shortest AAPs were obtained for *M. euphorbiae* and *M. persicae* (15 and 11 min, respectively) whereas *R. padi*, *S. avenae*, *B. brassicae* and *A. pisum* exhibited AAPs 30 min longer. The transmission rate obtained for *M. persicae* (83.3 %) was higher than the reported one in the literature. REFs assessment showed *A. pisum* and *B. brassicae* were poor efficient vectors while *M. euphorbiae* and *S. avenae* seemed to be efficient ones even though their respective REF were significantly lower than that of *M. persicae*. Regarding *R. padi*, *A. fabae*, they did not transmit PVY as they took the longest time to perform an intracellular puncture. The hypothesis consisting in a compensation of a weak PVY-transmission efficiency by a higher number of vectors was assessed for *M. euphorbiae* and *S. avenae*. Results did not corroborate such hypothesis. We discussed about the use of this new methodology for REF evaluation and the need to consider aphid behaviour for such assessment.