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The multiplicity of cellular infection changes between primary and secondary infected cells during systemic infection by a plant virus

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The multiplicity of cellular infection (MOI) is the number of virus genomes of a given virus species that infect individual cells. This parameter chiefly impacts the severity of within-host population bottlenecks, the intensity of genetic exchange, as well as the competition and complementation among viral genotypes. Only a fistful of formal estimations of MOI is currently available, and most reports have considered the MOI as a constant within the infected host. Nevertheless, the colonization of a multicellular host is a complex process during which the MOI may dramatically change in different organs and at different stage of the infection. We have used both qualitative and quantitative approaches to analyze the MOI during the colonization of turnip plants by the *Turnip mosaic virus*. Remarkably, different MOI values were observed at two phases of the systemic infection of a leaf. The MOI was low in cells primarily infected from virus circulating within the vasculature. Then, the founded populations moved from cell to cell at a very high MOI. Despite this elevated MOI during cell-to-cell progression, the viral lines displayed a territorial behavior and severely limited co-infection of cells by lineages originated in different primary sites. Our results thus unveil an intriguing colonization pattern where individual viral genomes initiate distinct lineages within a leaf. Kin genomes massively co-infect cells within a lineage, but co-infection by two distinct lineages is precluded. This pattern explains in an unforeseen way the common but uncharacterized phenomenon of spatial segregation of virus genotypes in infected plants.

Mots-clés : Multiplicity of Cellular Infection, MOI, Virus, Plant, *Potyvirus*, TuMV.