Long-term viral competition monitoring: a case of epidemiological rescue

Frédéric Péréfarres, Gael Thébaud, Pierre Lefeuvre, Murielle Hoareau, Loup Rimbaud, Frédéric Chiroleu, Bernard Reynaud, Jean-Michel Lett

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Perefarres F.[1,2], Thebaud G.[3], Lefeuvre P.[1], Hoareau M.[1], Rimbaud L.[1], Chiroleu F.[1], Reynaud B.[1], Lett JM.[1]

[1]CIRAD, UMR PVBMT, Pôle de Protection des Plantes, 97410 Saint-Pierre, Ile de la Réunion, France.
[2]Université de La Réunion, UMR PVBMT, Pôle de Protection des Plantes, 97410 Saint-Pierre, Ile de La Réunion, France.
[3]INRA, UMR BGPI, F-34398 Montpellier Cedex 5, France.

lett@cirad.fr

Biological invasions are major threats to biodiversity and the main causes of emerging viral diseases. The ongoing spread of *Tomato yellow leaf curl virus* is a major concern to the sustainable tomato production throughout the world. The two main strains of TYLCV have been successively introduced in Reunion Island providing a fortuitous field experiment to study the invasion and competition of these two emerging strains in a tropical and insular environment. In this study, a seven-year field survey was performed following the introduction of the Israel strain of TYLCV (TYLCV-IL) into a niche occupied by the Mild strain of TYLCV (TYLCV-Mld). A displacement of the resident TYLCV-Mld by the newcomer TYLCV-IL was observed in this short period. To understand the factors associated with this displacement, biological traits related to fitness were measured to compare these strains. Besides demonstrating a better ecological aptitude of TYLCV-IL, which explains its rapid spread and increasing prevalence, the first estimate of the number of viral particles efficiently transmitted by an insect vector for a circulative virus was obtained. However, TYLCV-Mld persistence in the field (especially in mixed infections with TYLCV-IL) spurred further experiments regarding the effects of the mixed infections on these biological traits. Our study revealed complex interplay between these two strains of one of the most emergent plant virus following their successive introductions in the insular and tropical environment of Reunion Island. This rare case of unilateral facilitation between two pathogens led to the epidemiological rescue and maintenance of the less fit strain.