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TYLCV-IS76 and TYLCV-IS141: fraternal but not identical tomato yellow leaf curl twin recombinant viruses

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ABSTRACT

Tomato yellow leaf curl virus (TYLCV), tomato yellow leaf curl Sardinia virus (TYLCSV) and TYLCV/TYLCSV recombinants (Begomovirus, Geminiviridae) are responsible of the damaging tomato leaf curl disease (TYLCD) in the Mediterranean. Tomato cultivars having the Ty-1 resistance gene were deployed in the Mediterranean Basin in the 2000s. Plants of those cultivars prevent symptom expression and reduce virus accumulation.

The shift from susceptible to Ty-1 resistant cultivars in Morocco coincided with the invasion of a peculiar TYLCV/TYLCSV recombinant virus (TYLCV-IS76) discovered in 2010 in symptomatic resistant plants (1). It replaced the parental-type viruses in the South of Morocco and spread to the whole country. The selective advantage of TYLCV-IS76 assessed experimentally in comparison with parental type viruses is consistent with a selection driven emergence (2). According to phylogenetic analysis, and the recombination profiles of recombinants generated in tomato plants co-inoculated with TYLCV and TYLCSV, TYLCV-IS76 has emerged through a rare process (3). TYLCV-IS141, another peculiar TYLCV/TYLCSV exhibit some but not all the features of TYLCV-IS76. Like TYLCV-IS76 it inherited a very short TYLCSV fragment of about 120nts, it was detected on symptomatic Ty-1 resistant plants and exhibit a selective advantage over parental viruses in experimental conditions. However, unlike TYLCV-IS76, TYLCV-IS141 was detected in Italy (1, 4, 5) and was found to be generated and positively selected in experimental conditions (3). The sampling effort is presently too low to know if TYLCV-IS141 has the same invasion potential as TYLCV-IS76. Both recombinants will be useful to identify the determinants of their similar competitiveness.

References

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