

ABSTRACT

Studies on the Etiology and Epidemiology of Begomovirus Diseases in Tomato in Trinidad.

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Potato yellow mosaic Trinidad virus (PYMTV) (Family: *Geminiviridae*; Genus: *Begomovirus*) disease is an important constraint to tomato production in Trinidad with an estimated yield loss of 30%. Studies were conducted to understand various aspects of the pathosystem as well as some of the epidemiological factors affecting disease incidence, with the ultimate objective of designing a coordinated, multi-component approach to begomovirus disease management. PYMTV was found in 85.7% of the farms surveyed with an overall average infection incidence of 56.4%. *Tobacco etch virus* (TEV) and *Tobacco mosaic virus* (TMV) by comparison were found in only 42.8% and 21.4%, respectively, of the farms investigated and occurred on average at 11.6% and 5%, respectively, of the tomato samples tested indicating that PYMTV is epidemiologically the most important. PYMTV disease incidence was high irrespective of insecticide and cultivar use. A sero-molecular detection system was developed for improved accuracy of diagnosis of begomovirus diseases. Using this optimized IC-PCR

detection system supplemented by dot blot assays, dicotyledonous weeds and crops within and outside tomato agro-ecosystems were investigated for mixed infection of begomoviruses. Under various testing conditions, the optimized immunocapture-PCR protocol was more sensitive and reproducible than standard-PCR or direct-binding-PCR. PYMTV was detected only in tomato and not in any of the weed species tested. Two other bipartite begomoviruses, *Rhynchosia mosaic virus* (RhMV) and *Sida golden mosaic virus* (SiGMV), which have never been reported before in Trinidad, were detected in *Rhynchosia minima* and *Sida rhombifolia*, respectively, but only outside tomato production areas. Mixed infections were not detected in the tomato crop or in any of the weed species. Since resistance to PYMTV was absent within *Lycopersicon esculentum*, a core germplasm collection of 92 accessions of wild *Lycopersicon* species were evaluated in infector plots with replications. It was found that resistance to PYMTV was present in 22 accessions. The implications of the foregoing results on the management of PYMTV disease in tomato and on certain aspects of begomovirus evolution in Trinidad are discussed.

Keywords: integrated disease management; whitefly-transmitted geminiviruses.