

Molecular Characterization of Tomato-Infecting Geminiviruses in Central America and an Overview of the Tomato Crisis in the Dominican Republic. Douglas P. Maxwell, Department of Plant Pathology, University of Wisconsin-Madison, Madison, WI, USA, 53706. (email:dum@plantpath.wisc.edu)

Tomato-infecting geminiviruses became a major constraint for tomato production in Central America in the late 1980's. Many different management strategies have been evaluated, but in Central America, most tomatoes still become infected with geminiviruses. In order to assist in the development of management strategies, the tomato-infecting geminiviruses were molecularly characterized. A 1.3-kb PCR fragment, which included part of the *rep* gene, the intergenic region and part of the *cp* gene, was obtained for samples from Costa Rica, Nicaragua, Honduras, Guatemala, and Jamaica. These PCR fragments were cloned and sequenced. Seven begomoviruses were identified: *Tomato yellow mottle virus* and *Tomato leaf curl Sinaloa virus* in Costa Rica, *Tomato severe leaf curl virus* in Nicaragua; *Tomato severe leaf curl virus*, *Tomato mosaic Havana virus*, *Tomato mild mottle virus* in Honduras; *Tomato severe leaf curl virus*, *Tomato golden mosaic virus*, *Tomato mosaic Havana virus*, *Tomato leaf curl Sinaloa virus*, and *Pepper golden mosaic virus* in Guatemala; and *Tomato mosaic Havana virus*- [JM1] in Jamaica. Additionally, specific PCR primers were used to detect *Tomato yellow leaf curl virus* in Jamaica and Dominican Republic. Other research teams have detected *Pepper Hausteco virus* and *Tomato leaf crumple virus* in Central America. General PCR primer pairs and a general DNA probe of the *cp* gene are available for detection of begomoviruses. Specific PCR primer pairs and specific DNA probes were developed for detection for *Tomato yellow mottle virus*, *Tomato leaf curl Sinaloa virus*, *Tomato severe leaf curl virus*, *Tomato mild mottle virus*, *Tomato mosaic Havana virus*, *Tomato golden mottle virus*, *Pepper golden mosaic virus*, and *Tomato yellow leaf curl virus*. Evidence was presented that recombination is an important mechanism in geminiviral evolution.

Tomato yellow leaf curl virus (TYLCV) is a monopartite Eastern Hemisphere begomovirus, whereas all Western Hemisphere tomato-infecting geminiviruses are bipartite. In 1994, two groups showed that TYLCV was present in the Dominican Republic and this introduced virus caused losses of 65% in the processing tomato production. With the introduction of a host-free period in the Dominican Republic, tomato production returned to the levels occurring before the introduction of TYLCV. Other management strategies such as virus-free transplants, new insecticidal chemistries, and slightly resistant cultivars also contributed to this yield increase. As in the Dominican Republic, TYLCV caused major losses in tomato production in Jamaica. Interestingly, both in the Dominican Republic and Jamaica, TYLCV replaced the indigenous bipartite tomato-infecting geminiviruses. TYLCV has also become more important in Florida than *Tomato mottle virus*.

In conclusion, geminiviruses continue to be a major constraint to tomato production in Central America and efforts should be increased to develop cultivars for Central America, which have resistance to the diverse bipartite geminiviruses. Even though TYLCV has not been detected in Central America, as yet, these cultivars should also have resistance to TYLCV.