

## Emergence and reemergence of tomato begomoviruses in the North-East of Morocco

Tahiri A.<sup>(1)</sup>, Granier M.<sup>(2)</sup>, El Montaser S.<sup>(1,3)</sup>, Blenzar A.<sup>(3)</sup>, Ouijja M A.<sup>(3)</sup>, Urbino C.<sup>(2)</sup>, Peterschmitt M.<sup>(2)</sup>

<sup>(1)</sup>Département de Protection des Plantes et de l'Environnement, Ecole Nationale d'Agriculture, Meknès, Morocco, <sup>(2)</sup> CIRAD, UMR BGPI, Montpellier, France, <sup>(3)</sup> Faculté des Sciences de Meknès, Beni M'hamed, Meknès, Morocco

In Morocco, Tomato yellow leaf curl disease (Tylc) has emerged in 1997 [1]. Two begomovirus species causing Tylc were identified, Tomato yellow leaf curl virus (TYLCV) and Tomato yellow leaf curl Sardinia virus (TYLCSV) [2]. Due to cold winters in North East of Morocco, tomato cannot be grown year round and the populations of the vector *Bemisia tabaci* are drastically reduced during this season. However, Tylc reemerges every year in the new tomato crops in July and incidences may reach up to 100% in September. The objective of the study was: (i) to assess the relative importance of TYLCV and TYLCSV, (ii) to understand how these viruses are overwintering, and (iii) to estimate the risk of recombinant emergence between TYLCV and TYLCSV.

The relative incidence of TYLCV and TYLCSV was estimated with leaf samples collected from 2003 onwards. Among tomato plants exhibiting the typical Tylc symptoms, more than 99% were infected with TYLCV and less than 1% with TYLCSV. Among the weed plants which were detected positive for TYLCV or TYLCSV, 85% were infected with TYLCSV and 15% with TYLCV. The tests of some tomato samples collected in 2001 revealed that shortly after the emergence of Tylc, TYLCSV was detected more frequently, suggesting that TYLCV has partially displaced TYLCSV from tomato.

Leaf samples were also collected in winter to detect potential reservoirs of Tylc. TYLCSV was detected on several weeds and on two winter crops, pea and faba bean. However, TYLCV was detected only on the two cultivated hosts and only in mixed infection with TYLCSV. The reemergence of TYLCV in tomato may be due to its overwintering in pea and faba bean.

The risk of emergence of TYLCV/TYLCSV recombinants is high, because several plants species were found to be coinfecting with these two viruses: tomato, winter crops, and weeds. The risk is increased by the fact that the winter survival of TYLCV, the most damaging virus of tomato, is apparently dependent of its switching to plant species which are the preferred hosts of TYLCSV. We are presently looking for recombinants in field samples of cultivated or weed plants which were detected positive for both TYLCV and TYLCSV.

[1] Peterschmitt, M., M. Granier, and S. Aboulama. 1999. First report of Tomato yellow leaf curl geminivirus in Morocco. *Plant Disease* 83:1074.

[2] Tahiri, A., A. Sekkat, A. Bennani, M. Granier, G. Delvare, and M. Peterschmitt. 2006. Distribution of tomato infecting begomoviruses and *Bemisia tabaci* biotypes in Morocco. *Annals of Applied Biology* 149 (2):175-186.