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## First report of tomato chlorosis virus and tomato infectious chlorosis virus in tomato crops in France

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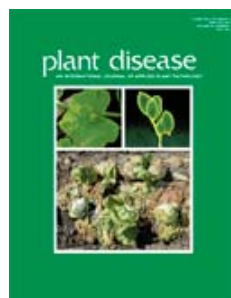
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# plant disease

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## Disease Notes

### First Report of *Tomato chlorosis virus* and *Tomato infectious chlorosis virus* in Tomato Crops in France

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Since 2002, yellowing symptoms associated with high levels of white-fly populations have been observed in plants of protected tomato crops in France. Symptomatic plants exhibited interveinal yellowing areas in older leaves, followed by generalized yellowing. Symptoms were not observed in young plants or fruits. *Trialeurodes vaporariorum* populations were generally abundant in spring, and *Bemisia tabaci* (established in France for approximately 10 years) became predominant in summer and fall. To check for the presence of *Tomato chlorosis virus* (ToCV) and *Tomato infectious chlorosis virus* (TICV), two whitefly-transmitted criniviruses known to induce yellowing symptoms, 696 samples were collected in the major tomato-growing areas; 573 samples from southern France and 123 samples from northern France. Total RNA was extracted from each sample and analyzed using reverse transcription-polymerase chain reaction (RT-PCR). Primers specific to ToCV (2) and TICV (1,3) were used to amplify either part of the heat-shock-like protein gene *HSP70h* (both viruses) or part of the diverged coat protein gene (*CPd*), (TICV only). A 439-bp DNA fragment was obtained with ToCV primers in 178 samples from southern France collected mainly from mid-spring to early fall from 2002 to 2004. Three RT-PCR products amplified from samples collected from diverse growing areas were sequenced and showed 99 to 100% sequence identity with published ToCV sequences from Spain (GenBank Accession Nos. AF215818, AF233435, and AF215817), Portugal (GenBank Accession No. AF234029), Sicily (GenBank Accession No. AY048854), and the United States (GenBank Accession No. AF024630). Considering the high frequency of ToCV-infected samples (41 positive samples of 112 samples collected in 2002, 71 of 295 collected in 2003, and 66 of 166 collected in 2004), this virus appears to be well established in southern France but remains absent in the northern regions. The presence of TICV was tested in 485 samples using the *CPd*-specific primers or the *HSP70h*-specific primers. The virus was detected in only two samples from Nice (southeastern France) in 2003 with both primer pairs. The *CPd* DNA fragment (700 bp) from one of these samples was sequenced, showing 98.9% sequence identity with a TICV Japanese isolate (AB085603). Results of these assays suggest that in contrast to ToCV, TICV is not yet broadly established in France. This difference could be associated with the specificity of the vectors, since ToCV is transmitted by *B. tabaci* and *T. vaporariorum*, while TICV is transmitted only by *T. vaporariorum* (4).

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