Integrated protection of tomato against begomovirus diseases

Begomoviruses are phytoviruses spread by the whitefly Bemisia tabaci *and are a serious threat to vegetable crops around the world, especially in the tropics [1]. These micro-viruses affect tomato crops in particular in Guadeloupe and Martinique. Management of these diseases is currently based on intensive chemical control and cultural practices suited to large-scale production. This is not suitable for the West Indian context of small open fields. Integrated protection based on understanding of epidemics could make it possible to identify strategies suited to the socio-agronomic context.*

Adulte du vecteur *B. tabaci*.

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Symptoms of TYLCV begomovirus in tomato

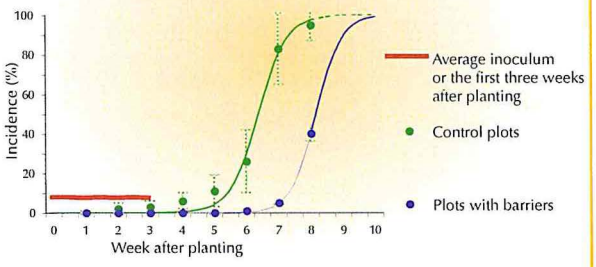
Methods

- Characterisation of the vector B. tabaci and of begomoviruses.
- Search for sources of resistance to several begomoviruses.
- Identification of the risk zones and key factors that favour begomovirus epidemics.
- Setting up experiments to evaluate the advantages of cultural practices.

Results

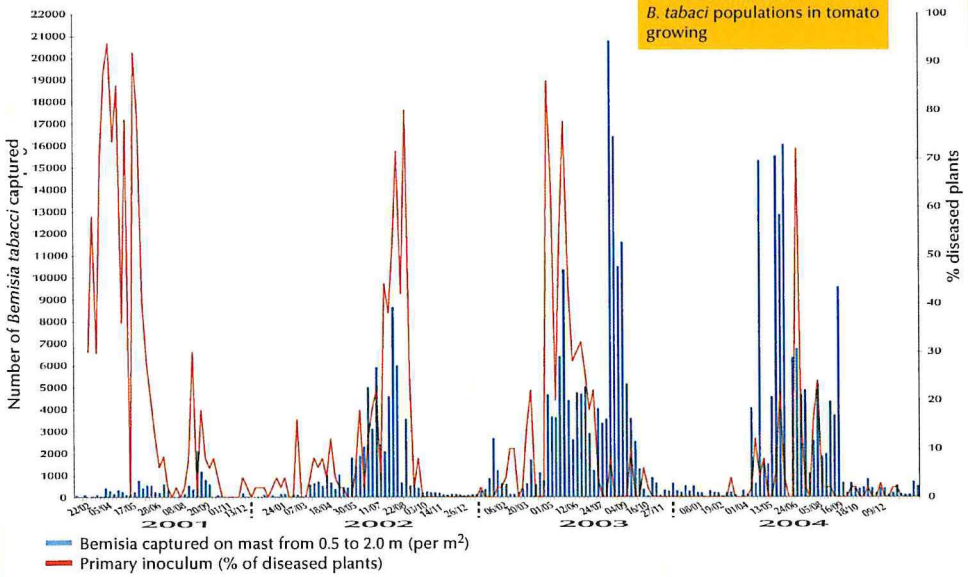
- Two begomoviruses, PYMV and TYLCV, whose damage is known world-wide [2] seriously affect tomato production in the French West Indies. Most of the B. tabaci populations are biotype B which is polyphagous and extremely effective in spreading begomoviruses.
- A source of resistance to PYMV has been identified and analysis of this resistance is in progress.
- Surveys showed that all the vegetable production zones in Guadeloupe and Martinique are concerned.
- The diversity of cultural practices is great and some enhance the occurrence of epidemics. Growing tomato all the year round favours the maintaining of the main sources of inoculum, as well as the contamination of nurseries and young field crops adjoining old, contaminated fields.

The use of physical barriers likely to slow the development of epidemics has given promising results but only during periods of low inoculum levels. A guard space making it possible to reduce inoculum sources at the end of the vegetable season, combined with physical protection, could slow the contamination of fields during the early weeks after planting.



Delaying the spread of begomoviruses in the presence of physical barriers

Monitoring primary inocula and the evolution of *B. tabaci* populations in tomato growing



The study of the population dynamics of *B. tabaci* and of the level of primary begomovirus inocula showed that the latter are present all the year round although the level is higher from June to September. The incidence of the disease was found to be greater when the inoculum level had been high in the first three weeks of cultivation.

Prospects

This work could be continued by the development of models of epidemics at field scale followed by adjustment with data drawn from experiments. Other integrated protection scenarios matching the socio-agronomic contexts could then be tested.

Références

1 Polston J.E., Anderson, P.K. (1997). The emergence of whitefly-transmitted geminiviruses in tomato in the western hemisphere. Plant Dis. 81 (12) : 1358-1369.

2 Moriones E., Navas Castillo J. (2000). Tomato yellow leaf curl virus, an emerging virus complex causing epidemics worldwide. Virus Res., 71 (1/2) : 123-134.

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