Bioecology of the invasive B biotype compared to the indigenous Ms biotype of *Bemisia tabaci* on tomato

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**Bemisia tabaci** an invasive pest

- **B. tabaci** a polyphagous insect:
  - > 900 plants host species belonging to more than 74 botanical families (Cook, 1986)

- The main insect pest of solanaceous crops
  - Vector of more than 111 viruses belonging to 5 virus genus
    - *(Begomovirus, Crinivirus, Closterovirus, Ipomovirus, Carlavirus)* (Jones, 2003)

Introduction  |  Mat & Met  |  Results: Lab study  |  Results: Field survey  |  Conclusion
The biotype B and recently the biotype Q invading the major agricultural areas.
Biotypes of *B. tabaci* in the area of the South West Indian Ocean

- Ms biotype, a clade originating from the SWIO region
- Recent introduction of biotype B in Réunion and Mauritius

1997 : TYLCV introduction in la Réunion

- The TYLC epidemic revealed the pullulation of *Bemisia tabaci* in vegetable crops

(Peterschmitt et al., 1999, *plant dis.*)

(Reynaud et al., 2003 *Phytoma*)
Questions

• Is the success of invasion of biotype B in the island of la Réunion linked to better life-history traits (/Ms) ?

• Are biotypes repartition differential around la Réunion ? (segregating niche habitats according to host plants / abiotic factors?)

Introduction  Mat & Met  Results: Lab study  Results: Field survey  Conclusion
Material and Method

I- Lab study

At 5 different constant temperatures (15 to 35°C) on tomato plants

Immature stages (daily records):

• Egg hatching, length of development, survival

Adult stage:

• Longevity, Fecundity
• Adult and egg sizes

II- Field survey

Field collect on different host plants: cultivated/weeds, in 18 sites
Net reproductive rate (Ro)

- $R_{OB} > R_{OMS}$ at any temperature
- $Ro$ significantly different at 25°C
B(fecundity) > Ms(fecundity) at any temperature
At 25°C 160 eggs/female for B and only 80 for Ms females
High fecundity = r traits (good colonist)
Adult and egg sizes

- $B(\text{size}) > Ms(\text{size})$
- Bigger size = K traits (good competitor)
Biotype repartition

- 700 adults
- 12 different host plants weeds/cultivated
- Biotype differentiation by microsatellite markers (Delatte et al., 2006, Genet. Res.)

B in the West, Ms in the East
Host plants and abiotic factors

Distribution of Biotypes depending on the host plants and rainfall

Introduction

Mat & Met

Results: Lab study

Results: Field survey

Conclusion
Conclusion

• Biotype B is a good invader on tomato plants with no trade off between r –traits (high: Ro, fecundity, survival) and K-traits (size, longevity)
• Biotype Ms is potentially invasive in more humid areas
• Human-altered environments (with low plant biodiversity) favour biotype B invasions

Delatte et al., accepted Biol. Invasion
Future prospects

B x Ms hybrids had been described in the field in Reunion (Delatte et al., 2006, Genet. Res.) and different endosymbiont composition between B and Ms populations observed.

Are gene flow and/or endosymbiontes acquisition allow to acquire rapidly a better adaptation to host plants and/or climatic conditions?
Thanks for your attention