Tropentag, October 11-13, 2006, Bonn

"Prosperity and Poverty in a Globalised World—
Challenges for Agricultural Research"

Interaction Between the Physiological State of *Ralstonia solanacearum*, Causal Agent of Bacterial Wilt, in Tomato Xylem Vessels and the Tomato Genotype

K. Wydra, Zekarias Leykun

University of Hannover, Institute of Plant Diseases and Plant Protection, Germany

Abstract

Bacterial wilt caused by *Ralstonia solanacearum* is difficult to control due to the high variability of the pathogen and its capability to survive easily in adverse environments. Therefore, use of resistant genotypes is the key option for integrated control. However, latent infection may cause breakdown of resistance, pathogen dissemination or substantial yield reduction even with low wilt incidence. Therefore, the level of latent infection was quantified in fourteen 'resistant' tomato genotypes in relation to wilt incidence. *R. solanacearum* was detected in the collar of all symptomless genotypes and, hence, initial root infection was not limiting for bacterial colonisation. Highest differences in bacterial numbers were observed in the mid-stem parts of 'resistant' genotypes suggesting existence of effective resistance mechanisms on mid-stem level in some genotypes. Immunohistochemical analysis revealed differential reactions in xylem cell wall structure and composition in resistant and susceptible genotypes. Bacterial numbers and wilt incidence were positively correlated, with a higher correlation coefficient in the mid stem parts than in lower or upper plant parts. Therefore, quantification of bacteria in the mid-stem is suggested as a complementary criterion in addition to wilt symptom evaluation to identify genotypes, which suppress the latent pathogen multiplication.

The ability of *R. solanacearum* to enter the viable but non-culturable (VBNC) state in planta was examined in different genotypes after infection. A significant percentage of *R. solanacearum* cells entered the VBNC state in xylem vessel, increasing in number with time after infection in symptomatic plants. The influence of the plant on the phase change of the bacterium could be an additional characteristic for the selection of resistant genotypes.

Keywords: Bacterial wilt, host plant resistance, Ralstonia solanacearum, tomato

Contact Address: K. Wydra, University of Hannover, Institute of Plant Diseases and Plant Protection, Hannover, Germany, e-mail: wydra@ipp.uni-hannover.de