PATHOLOGICAL AND PHYSIOLOGICAL STUDIES ON THE TOMATO BACTERIAL SPOT DISEASE

By

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B.Sc. Agric. Sc. (Plant Pathology), Ain Shams University, 2006

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ABSTRACT

Mohamed Ahmed Mohamed Gaber : Pathological and Physiological Studies on the Tomato Bacterial Spot Disease. Unpublished M.Sc. Thesis, Department of Plant Pathology, Faculty of Agriculture, Ain Shams University, 2011.

Bacterial spot of tomato can affect foliage, fruits, blossoms and stems. This study was conducted to characterize *Xanthomonas vesicatoria* isolates from different locations in Egypt, and to study isolates diversity. Also, the susceptibility or resistance of some tomato cultivars to infection with bacterial spot was investigated, and to find out some biochemical and physiological changes within infected tomato plants due to infection. Finally the potentiality of some bactericides, bioagents (commercial products) and resistance inducers in controlling bacterial spot disease under naturally and artificially infection conditions was evaluated. The majourty of isolates were obtained from Qalyubia governorate (20 isolates), followed by Beheira (16 isolates) and Sharkia (11 isolates). So the total isolates reached fourty-seven isolates of *Xanthomonas vesicatoria* which were isolated from leaves and fruits of tomato and pepper, collected from previously mentioned three governorates in Egypt. *Xanthomonas vesicatoria* isolates were characterized and identified on the basis of morphological, biochemical and physiological characteristics revealing 15 isolates. Isolates TX5 and TX1 were identified as *Xanthomonas vesicatoria*, 96% and 86%, respectively, using Biolog system. *Xanthomonas vesicatoria* isolates varried in pathogenicity against tomato plants where isolate TX5 and TX1 were highly pathogenic, while isolates TX3, TX4, PX2 and PX4 were moderatley pathogenic, however TX2, PX1, PX3 and PX5 isolates were less pathogenic. Molecular differences were detected among 10 isolates of *Xanthomonas vesicatoria* using RAPD-PCR test with one primer, where a specific band was observed in the DNA of the highly virulent isolates only, which can be used as a marker of virulence. Tomato cultivars varried in their

susceptibility to bacterial spot (isolate TX5) where cultivar Castle Rock was the most susceptible cultivar while H 339 was highly resistant to the disease. Five tomato cultivars were screened for defence-related enzymes. Based on the inducible amounts of these enzymes upon pathogen infection, the tomato cultivars were correlated with the disease incidence under greenhouse conditions. Enzyme levels were increased in infected plants compared with control. The present results indicated that, there was no correlation between the degree of host resistance and the enzymes levels. Application of bactericides, bioagents and resistance inducers significantly reduced the disease compared with the control. Under greenhouse conditions, application of bioagents, bactericides and resistance inducers were found to be more effective when spray before inoculation than after inoculation. Efficacy of all treatments were increased with increasing their concentrations. Streptomycin sulphate was more effective against the disease than Galbin copper or Kocide 101. Also, the commercial products Bio-Cure-B or Bio-Cure-F were highly effective against the disease than Symbion N-R or Symbion N-G. Salicylic acid and acetylsalicylic acid as resistance inducers, showed high efficacy in reducing the disease compared with Bion. Under commercial greenhouse conditions, streptomycin sulphate was the most effective treatment against the disease followed by Bio-Cure-B. Application of, commercial bioagents products and resistance inducers, at 3 different intervals gave higher efficacy than one time of application. All tested compounds were more effective under commercial greenhouse conditions than under greenhouse conditions.

Keywords: Tomato, *Solanum lycopersicum*, bacterial spot, *Xanthomonas vesicatoria*, diversity, defence enzymes, RAPD-PCR.

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