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Title: EPIDEMIOLOGY AND MANAGEMENT OF EARLY BLIGHT OF TOMATO CAUSED BY *Alternaria solani* (Ellis and Martin) Jones and Grout IN JHARKHAND

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Abstract: Early blight caused by *Alternaria solani* is prevalent in tomato growing areas of India particularly in Jharkhand State and is considered as one of the limiting biotic factor for successful cultivation of tomato. The pathogen was isolated from infected leaves and identified on the basis of morphological characters after microscopic examination of the culture on PDA medium as *Alternaria solani*. Mycelium was dark brown, Conidiophores were brown to olivaceous brown, conidia having two to seven transverse and one to three longitudinal septations with long beak. The dimensions of conidia were ranged from 84.6 - 235.0 × 18.8 - 37.6 µm. In host range studies of *A. solani*, Out fifteen plants only two plant species viz., *Solanum melongena* L. and *Solanum tuberosum* L. could be infected experimentally. The crop sown on November, 11 recorded lowest per cent disease severity of 19.3 per cent. The crop sown on the above date also recorded highest fruit yield (233.5 q/ha). A relative lower PDI (20.7%) was recorded in the crop sown on November, 18. Late sowing favoured development of early blight of tomato. The temperature ranged from 6.8 to 22.9°C, relative humidity ranged from 60.6 to 82.3 % sun shine hours ranged from 8.2 to 8.7 hr and rainfall ranged from 0.2 to 0.5 mm apparently favoured disease development during 2013-14. Disease severity was progressing at linear rate throughout the plant growth and it was positively correlation with morning relative humidity, evening relative humidity, mean relative humidity and rainfall and negative correlation with sun shine hours. Out of thirteen varieties screened against early blight of tomato, the cultivar, Arka vikas and Swarn sampada showed moderately resistant reaction against the disease. In vitro and in vivo evaluation of plants extracts against early blight pathogen revealed that *Allium sativum* clove extract showed maximum inhibition of Pathogen followed by *Allium cepa* bulb extract. In vitro assay of biocontrol agents against *A. solani*. *Trichoderma* isolate 6 proved best antagonist due to its growth inhibition over control of 28.8%. It was evident from the evaluation of biocontrol agents in pot condition that *Trichoderma* isolate 6 (1.0 %) was found to be the most efficacious biocontrol in reducing disease intensity (22.7%) coupled with highest yield (410.6 g/pot). This was followed by *Trichoderma* isolate 1 (1.0 %) having disease intensity of 23.3 % and yield of 371.33 g/pot. In vitro evaluation of fungicides against *A. solani*, the fungicides, Tricyclazole + Hexaconazole (ICF110), Tabuconazole + Trifloxystrobin (Nativo), and Hexaconazole + Zineb (Avtar) were found to be most effective which inhibited 94.4 per cent growth of *A. solani* and were significantly superior over control. In vivo evaluation of fungicides against early blight of tomato trial, three foliar sprays of Hexaconazole + Zineb (Avtar) @ 0.1% recorded minimum disease intensity (12.0%) and highest increase in yield over control of 35.6%. In field trial on suppression of early blight of tomato through most effective bioagent (*Trichoderma* isolate 6) and fungicide (Avtar), seed treatment with (Avtar) @ of 2g/kg seed plus root dip plus two foliar sprays of Avtar (0.1% each) recorded lowest disease intensity of 10.3% and fruit infection of 2.7%. This treatment also recorded highest tomato yield of 228.6 q/ha. When cost benefit ratio was taken into consideration then highest cost-benefit ratio of 1:95.6 was recorded when seed treatment with Avtar @ 2g/kg seed was applied. This treatment also recorded net return per ha of Rs 25829.8.

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