

ABSTRACT

Global tomato production is characterized by inconsistent quality and yields partly emanating from biotic constraints attributed to fungal foliar diseases. In Kirinyaga County, where tomato production is a major source of livelihoods, there exists knowledge gaps on prevalence fungal foliar diseases such as early blight, late blight and *Septoria* spot, and the susceptibility of locally grown tomato varieties to the infection. The objective of this study was to assess the prevalence of three fungal foliar diseases, isolate and characterize the pathogens, assess varietal susceptibility of some locally grown tomatoes to the pathogens under control conditions, and determine the biocontrol potential of some rhizospheric *Streptomyces* sp. Incidence and severity was assessed using a cross sectional survey design on established macro plots within tomato farms. Pathogen characterization was carried out using morphological and molecular techniques. Susceptibility of tomato varieties to the fungal pathogens was evaluated by artificial inoculation in a greenhouse arranged in a completely randomised design (CRD). Antifungal activity of *Streptomyces* was determined *in-vitro* in co-plate culture and *in-vivo* under artificial inoculation using CRD in the greenhouse. Molecular characterization for fungal pathogen and *Streptomyces* involved BLASTIN analysis of DNA amplicon Sanger sequenced nucleotides and use of NCBI databases. Percentages data of disease incidences and severity were subjected to analysis of variance (ANOVA) using Kruskal Wallis *H* test at $\alpha = 0.05$. Median comparison was performed using Steel Dwass Critchlow Fligner (SDCF) with bonferroni adjustment in Statistical Analysis Software (SAS) version 9.4. Conidia lengths (μm) was subjected to ANOVA and significant means separated by Least significance difference (LSD) at $\alpha = 0.05$. Susceptibility data (%) was subjected to ANOVA and significance means separated using LSD at $\alpha = 0.05$. Zones of inhibitions for the antifungal activity of *Streptomyces* isolates in co-plate culture were analysed using ANOVA and significance means separated using LSD at $\alpha = 0.05$. Disease reduction data on antifungal activity of *Streptomyces* were analysis by Kruskal Wallis *H* test and medians of significant means compared by SDCF $\alpha = 0.05$ in SAS. Incidences and severity of early blight, late blight and *Septoria* leaf spot in tomato farms differed significantly ($p < 0.05$) among the villages and agro-ecological zones. Incidence of early blight ranged from 35.7% to 76.65% with severity ranging from 17.15% to 50.87%. The incidence of *Septoria* leaf spot ranged from 23.56% to 93.42% with severity ranging from 16.67% to 44.44%. The incidence of late blight ranged from 33.33% to 86.63% with severity ranging from 16.67% to 33.33%. The incidence of early blight was significantly higher in AEZ UM3 (Median= 75%), the incidence of *Septoria* leaf spot was significantly higher in AEZ LM4 (Median = 83.33%) while the incidence of late blight was significantly higher in AEZ UM3 (Median= 50%). The severity of early blight was significantly higher in AEZ UM3 (Median = 38.89%), *Septoria* leaf spot was significantly severe in AEZ LM4 (Median = 40.28%) while late blight was significantly higher in AEZ UM4 (Median = 32.72%). Morphologies of pathogens differed significantly ($p < 0.05$) with conidia lengths from 52.8 and 204.20 μm (Early blight pathogen), 37.20 and 102.30 μm (*Septoria* leaf spot pathogen) and 26.4 μm to 49.3 μm (Late blight pathogen). Molecular characterization of some selected culture implicated *Alternaria solani* and *A. alternate* involvement in causing early blight. Tomato varieties differed in their susceptibility to foliar fungal pathogens ($p < 0.05$). Kilele F₁ was the most susceptible variety (73.84%) while Terminator F₁ was least susceptible (56.48%) to late blight pathogens. Kilele F₁ was the most susceptible variety (57.99%) while Terminator F₁ was least susceptible (37.73%) to *Septoria* leaf spot pathogens. Riotinto F₁ was the most susceptible variety (72.11%) while Terminator F₁ was least susceptible (56.48%) to late blight pathogens. *Streptomyces* assessed differed in their antifungal activity significantly ($p < 0.05$). Tomato inoculated with *Streptomyces* isolate Strep6