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Temporal and spatial epidemic development of early blight (*Alternaria solani* Ell. and Mart) in tomato as a function of different soil nutrition sources

Poly Saha and Srikanta Das

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ABSTRACT : Early blight, caused by *Alternaria solani* Ell. and Mart, is a ubiquitous disease that can reduce tomato yield. Adequate crop fertility and judicial application of different sources of organic and inorganics usually suppress the development of this disease. So, the field experiment was conducted for the two consecutive years 2013-14 and 2014-15 with an aim to explore the temporal and spatial spread of early blight on tomato under different soil nutrition sources to know the nature of progression of the disease in all treatments and also to evaluate the minimum apparent infection rate that restrict disease development at low level. One susceptible tomato variety "Patharkuchi" (indeterminate type) was taken and natural epiphytotic condition was permitted. Disease severity was recorded at 10 days interval and the infection rate (r or k) was calculated after logistic and gompertz transformation of the realized and observed value of the disease severity (expressed as AUDPC). All the treatments combination reduced the disease severity significantly as compared to untreated control. Disease severity was found to be minimum (AUDPC = 97.32 and 102.50) in only fertilizer treated plots i.e. N_{150}:P_{60}:K_{60} and N_{180}:P_{90}:K_{90}, respectively for the year 2013-14 and 2014-15. Maximum disease severity was observed in N_{220}:P_{110}:K_{110} along with 3.2 ton ha^{-1} FYM treated plot (AUDPC = 107.15 and 114.83) for both the two experimental years. Here, AUDPC is used to quantify the disease over different point of time and two growth models logistic and gompertz was tested, through which disease progress curve move over time. Results revealed that the two models were not equally fit for depicting disease progress in every treatment but for linearization of area under disease progress curve (AUDPC) following the two models (logit and gompit) revealed that gompit fit better than logit for the spread of early blight disease severity over time and this was confirmed by the low standard error estimate (MSE) value of gompertz in all the treatments. Logit was found to fit better where only FYM was applied followed by the treatments where organics and inorganics were applied in combination.

Key Words: Apparent infection rate, area under disease progress curve, early blight, Gompertz model, logistic model, tomato.