

## Abstract

The shift in the geographical spread of invasive pests in Africa has rarely been linked directly to climate change. However, it is predicted that environmental changes play a significant role in spreading and expanding pests. The occurrence of new tomato invasive insect pests has been increasing in Uganda during the past century. Assessing the impact of temperature, rainfall, relative humidity, and windspeed on the occurrence of invasive tomato insect pests, gives a better understanding of managing and limiting the bio-invasion process sustainably. We used the Mann Kendall trend Test to establish trends in climate variables from 1981 to 2020 and to document the trend in the occurrence of new invasive pests. The relationship between climate variables and pests occurrence is analyzed using Pearson's correlation and the Generalized Linear Model (GLMquasi-Poisson) in R-software. The results showed that temperature and windspeed have significantly increased in both Kampala and Namutumba by 0.049 °C, 0.005 m s<sup>-1</sup> and by 0.037 °C, 0.003 m s<sup>-1</sup> per year respectively while in Mbale there was no change in wind speed pattern and a non-significant decrease in temperature. There was an overall rainfall increase in Kampala (p = 0.029) by 0.241 mm, Mbale (p = 0.0011) by 9.804 mm, and Namutumba (p = 0.394) by 0.025 mm. On the other hand, humidity has decreased both in Kampala (p = 0.001) by 13.3% and in Namutumba (p = 0.035) by 13.2% while there was a no significant change in Mbale. The results of GLM showed that each variable, taken individually, had a direct effect on the pests' occurrence in all three districts. However, with all these climate variables taken together, the effect on the pests' occurrence varied with each of the three districts; Kampala, Mbale, and Namutumba. This study demonstrated that pest occurrence is different from one agroecology to another. Our findings suggest that climate change is a driver that favors bio-invasion of tomato invasive insect pests occurrence in Uganda. It calls for awareness to policymakers and stakeholders to consider climate-smart pest management practices and policies to deal with bio-invasion.