

Current and future invasion potential of *Senna didymobotrya* under the changing climate in Africa

Elias Cherenet Weldemariam¹ and Sintayehu Dejene¹

¹Haramaya University

October 9, 2020

Abstract

Climate change is thought to facilitate the introduction and spread of invasive alien species. The present study aimed at examining the present and future invasive potential of *S. didymobotrya* under the changing climatic conditions using the Species Distribution Model. Two representative concentration pathways (RCP4.5, and RCP8.5), and seven bioclimatic including one topographic variable were used to simulate the current and future (2050s and 2070s) distribution of *S. didymobotrya* invasion in Africa. The model performance evaluation is done based on, the area under the receiver operating characteristic curve (AUC) and true skills statistics (TSS). The results of the study showed that under current climatic conditions 18% of the continent of Africa is suitable for *S. didymobotrya* establishment and invasion. Eastern Africa is seen as the most suitable habitats for *S. didymobotrya* invasion followed by southern Africa. The predicted model shows that in the 2050s under RCP4.5 and RCP8.5, 3.4% and 3.17% of the continent will be highly suitable for *S. didymobotrya* invasion, respectively. In the 2070s, the highly suitable area for the species is predicted to be 3.18 % and 2.73% in RCP4.5 and RCP8.5, respectively. The low to moderate suitability under RCP 4.5 and RCP8.5 in the 2050s is projected as 17.4 % and 20.5 % and this area is increased in the 2070s to 19.11% and 22.82 for the RCP 4.5 and RCP 8.5, respectively. The results of this study indicate a significant increase in the vulnerability of habitat for *S. didymobotrya* invasion under the future climatic conditions. Our current finding suggests the future biodiversity conservation strategy and policy direction should focus on the means and strategy of limiting the rate of expansion of invasion and distribution.

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