

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

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Abstract

Senna didymobotrya is invasive native flowering shrubs mainly grow in Africa. Climate change thought to facilitates the introduction and spread of invasive alien species. The present study aimed at examining the present and future invasion of *S. didymobotrya* under the changing climatic using species distribution modeling. The mean AUC and TSS value of the model was (95%) and (81%), respectively, which put the model under an excellent category. Our result showed under the current climatic conditions 18.11% of the continent is suitable for *S. didymobotrya* invasion. Eastern African countries are found the most suitable habitat for *S. didymobotrya* invasion followed by southern African countries. The total highly suitable area for the species is 3.4% and 3.17% in 2050s under RCP4.5 and RCP8.5, respectively. In the 2070s, the highly suitable area is predicted as 3.18 % and 2.73% in RCP4.5 and RCP8.5, respectively. An area with the category of 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 showed a substantial contraction in the high suitability areas, but a large increase in the low and moderately suitable habitat. Despite the contraction in highly suitable areas, countries which are found suitable in the present climatic condition remains suitable for *S. didymobotrya* establishment. Our ensemble predicted a significant increase in the vulnerability of habitat for invasion under the future climatic scenarios. Our study 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 in different ecosystem types, hence reduce the expected harm in the ecosystem services.

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